ENGINEERING NEWS-RECORD

MAY 3, 1956

Planning Baltimore's banner year in water p. 40

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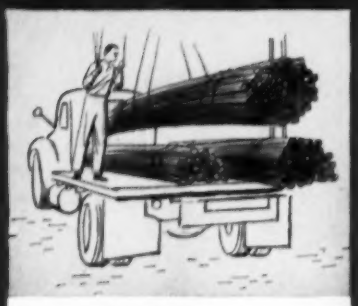
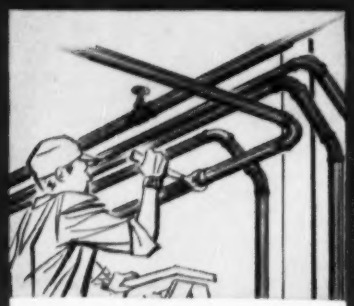


1. Cost of Pipe

The important thing about this cost is that it represents only *one small part* of the piping picture and should not establish the only pipe comparison guide.

2. Cost of Installation

This cost generally represents the *major part of the piping investment* and includes labor, fabrication, valves, fittings, covering, and overhead.



3. Cost of Maintenance

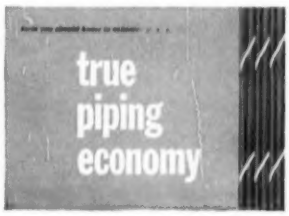
This is the money paid to keep the piping system in operation as long as the need for it exists. The amount spent depends largely on the quality of pipe used.

3 IMPORTANT COSTS THAT SHOW WHY WROUGHT IRON PIPE PROVIDES TRUE PIPING ECONOMY

This breakdown of piping system costs underscores the reasons why wrought iron pipe users enjoy maximum piping economy even though they pay more, *initially*. These users know that they buy an *installed piping system*, not just the pipe. And because the greatest cost of this installed piping system is in labor, valves, fittings, fabrication, covering, and overhead, the difference between the cost of the wrought iron installation and what a low-first-cost pipe installation would have been, shrinks to an insignificant amount in the cost of the *total piping contract*.

But still more important to the plans and pocketbooks of wrought iron pipe users is the Cost of Maintenance. One user put it this way. "A wrought iron installation is like having money in the bank." He was simply expressing wrought iron's longer service in terms of money saved in repairs, replacement, and maintenance. There's no doubt about it . . . when you consider the three costs, you can buy the best—wrought iron—and get a bargain at the same time.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. International Division: New York, N. Y. *Available throughout the world.*



Write for Booklet

The booklet, *True Piping Economy*, gives detailed information on the cost facts presented here, plus many others. You will find it a valuable guide in placing pipe selection emphasis where it will profit you most.

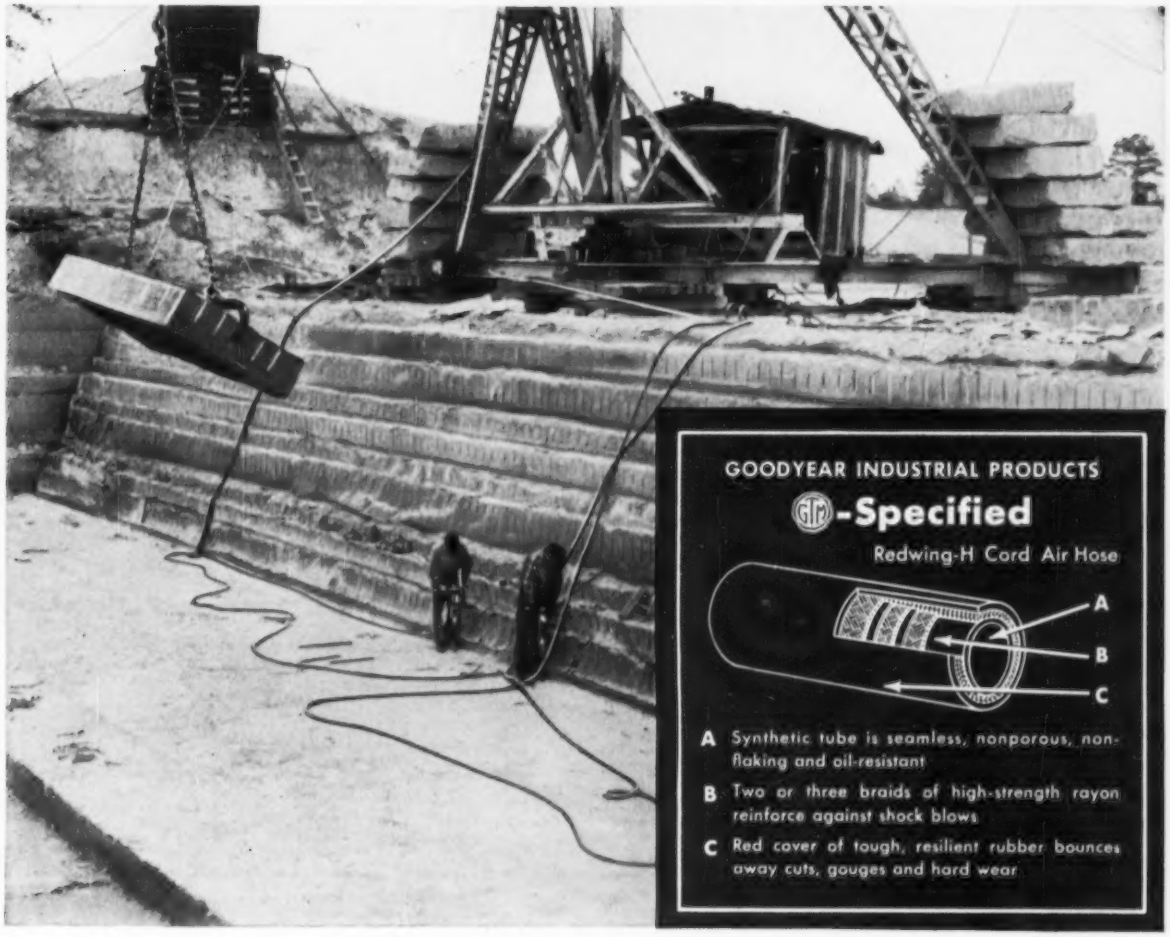
BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS


GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
Redwing-H Cord Air Hose
A
B
C
A Synthetic tube is seamless, nonporous, non-flaking and oil-resistant
B Two or three braids of high-strength rayon reinforce against shock blows
C Red cover of tough, resilient rubber bounces away cuts, gouges and hard wear

G.T.M. cuts jackhammer hose costs over 50%

About four months was the average service for air hose on the jackhammers in this Midwestern quarry. Extreme abrasion, cutting and gouging plus direct blows from heavy rock were the reasons for early failure.

REDWING-H Cord Air Hose (see blueprint) was specified by the G.T.M.–Goodyear Technical Man. This rugged hose takes the beating in stride—lasts over a year—three times as long—cuts costs by more than half.

Similar savings may be yours, on hose or any industrial rubber goods, by consulting the G.T.M. You can contact him through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Redwing—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

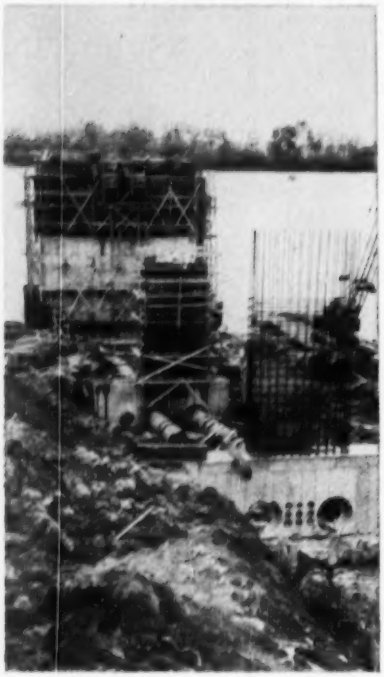
REDWING-H CORD AIR HOSE by

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

Symons FIELD REPORT...



Symons Forms used on Ohio River Intake Job...

60,000 square feet of concrete forming went into this job constructed for the city of Henderson, Kentucky. The wall started at elevation 317 (sea level elevation) or 21 feet below the river pool stage and when completed was topped at 385 or 47 feet above the water.

15,000 square feet of Standard Symons Wood Frame Forms were used, in sizes 2' x 4', 2' x 6' and 2' x 8'.

George Ryan, Vice President said, "Even in the eight foot lengths our Symons Forms are easily carried by one man. Another feature which we have found helpful is the ease of removing a panel at any place in a wall to clean keyways and straighten reinforcing steel. This has saved us a lot of time."

Three piers for an all access bridge to the intake structure were also formed with Symons Forms. Part of the project involved an extension of the Henderson power plant.

Symons Forms can be rented with purchase option, all rentals to apply on purchase price. Symons Clamp & Mfg. Co., 4265 Diversey Avenue, Dept. E-6, Chicago 39, Illinois.

Ray Ryan Sons Company, Inc., Evansville, Indiana
General Contractor

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ENGINEERING NEWS-RECORD Vol. 156, No. 18, May 3, 1956

Published weekly by McGraw-Hill Publishing Company. James H. McGraw (1860-1948), Founder. **Executive, Editorial, Advertising and Subscription Offices, McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y.** Publication Office, 99-129 North Broadway, Albany 1, N. Y. Donald C. McGraw, President; Paul Montgomery, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Circulation Director. **SUBSCRIPTIONS:** Address correspondence to Engineering News-Record—Subscription Service, 99-129 North Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address. Subscriptions are solicited only from persons with an identifiable commercial or professional interest in construction and building. **Position and company connection must be indicated on subscription orders.** Single copies 35¢. Subscription rates—United States and possessions, $6.00 a year; $9.00 for two years; $12.00 for three years. Canada $8.00 a year; $12.00 for two years; $16.00 for three years. Other Western Hemisphere and the Philippines, $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries $20.00 a year; $30.00 for two years; $40.00 for three years. Second class mail privileges authorized at Albany, New York. Printed in U. S. A.

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NORTHWEST Crane Equipment is so designed as to meet any crane problem you may have. There is a wide range of boom hoist equipment. Mast-type gantry with the sectional boom hoist rigging and pendent lines make possible ease of adjustment to boom length changes. You have a choice of two or three sheaves at the boom point. Adjustable jib, telescopic boom struts, removable counterweight, extended boom point sheave shaft for piledriver leads—all can be had to meet your requirements. And, if you need long crawlers and wide treads, they're available.

STANDARD BOOM HOIST

The Northwest Standard Boom Hoist is a self-locking worm gear boom hoist running in an oil bath and it operates under power both up and down. It is safe, smooth, positive!

INDEPENDENT HIGH-SPEED BOOM HOIST

The Northwest Independent High-Speed Boom Hoist is independent of all other operations and permits booming with power controlled lowering without sacrificing either of the main drums. It is a rugged, heavy-duty unit capable of hour in and hour out operation. There is no finer, more reliable hoisting assembly.

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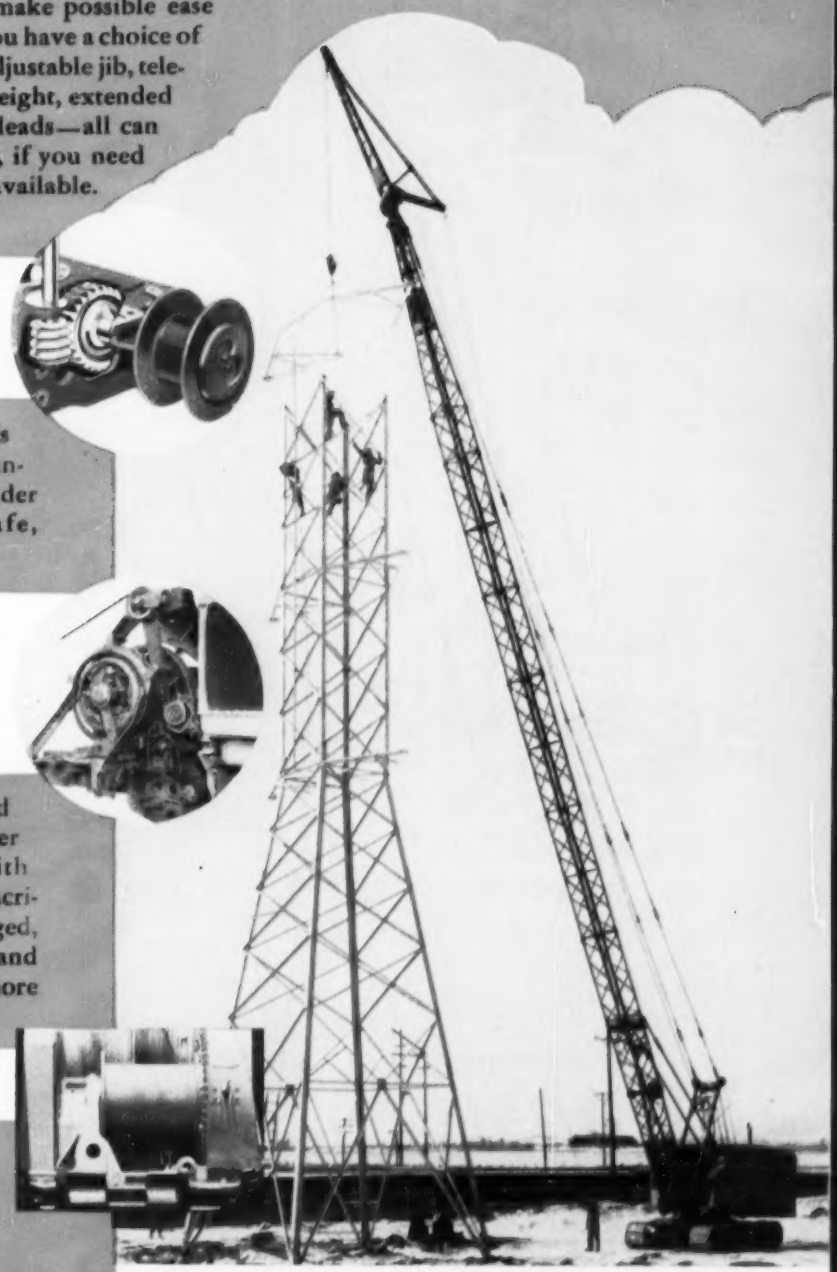
The Northwest 3rd Drum operates independently of the main drums and is fitted with its own clutch and brake. It makes possible 3 load lines with a standard worm boom hoist; and 3 load lines with the independent high-speed boom hoist.



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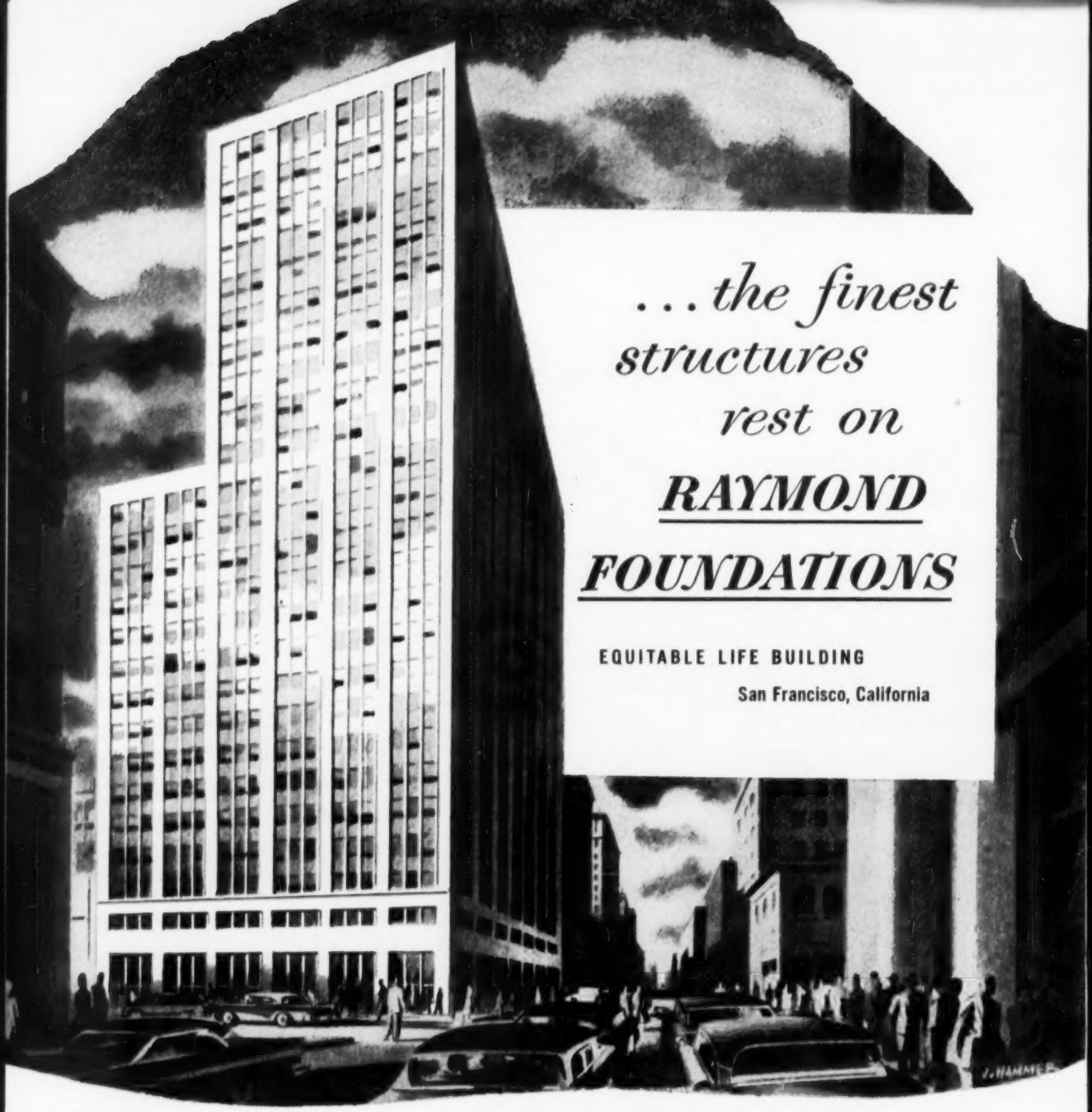

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COMPLETE SERVICES FOR ALL TYPES OF CONSTRUCTION.

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WATERTIGHT AMVIT JOINTED CLAY PIPE SAVES UP TO 12% ON INSTALLATION COSTS

Borough of Milltown, N. J.

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C. J. Pardun & Son

Says C. J. Pardun, President, C. J. Pardun & Son

"Despite wet trench conditions, we were able to cut costs and installation time on laying a 10-inch sanitary line for the Borough of Milltown, New Jersey", Mr. Pardun continues.

"Just as important, Amvit jointed clay pipe makes a watertight line. Prevents ground water infiltration and saves pumping and treating thousands of gallons of waste water."

The Amvit joint is built in, ready for installation. Since no special preparations are needed, the line is laid quickly and easily. Immediate back filling is possible. When the pipe is "pushed" together, the joint is in constant compression. Nothing, even water, can force its way in or out.

Amvit Jointed Clay Pipe is just one of the many products manufactured in our plants across the nation. American Vitrified Products Company also produces concrete pipe, clay pipe, flue liners—both glazed and unglazed and clay liner plates.

For more information, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.

The Amvit joint is made of a new acid resistant plastic material with rubber characteristics. Like the pipe, the joints will not be harmed by any condition of underground service. The pipe is simply pushed together. The trench is then ready for backfilling.

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SPECIFY GM DETROIT DIESEL

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YOU CAN BUY, run and maintain a General Motors Detroit Diesel for less than any other Diesel.

For a GM Detroit Diesel sells for less than other Diesels of comparable power.

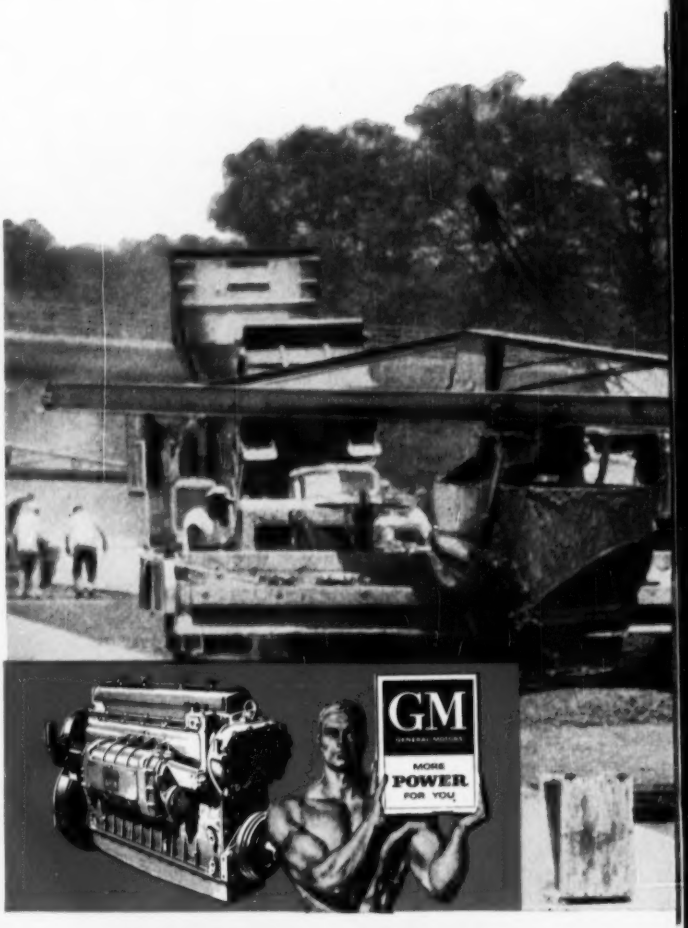
It costs less to run because its fast 2-cycle operation gets more work done on a gallon of fuel—moves more yardage per day.

And hundreds of contractors tell us it costs less to maintain because it runs longer between overhauls. What's more, replacement parts cost less, too.

You can get GM Detroit Diesel power in practically every kind of construction equipment—*it's America's first choice Diesel.*

Call in your local GM Detroit Diesel distributor or dealer for full details on GM Detroit Diesel power. Do it soon—it can mean the difference between profit and loss on your next contract.

Single Engines . . . 30 to 300 H.P. Multiple Units . . . Up to 892 H.P.



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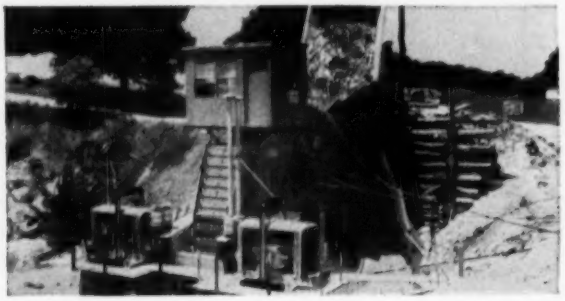
America's Largest Builder of Diesel Engines

15,000 HOURS—ONLY $150 FOR REPAIRS

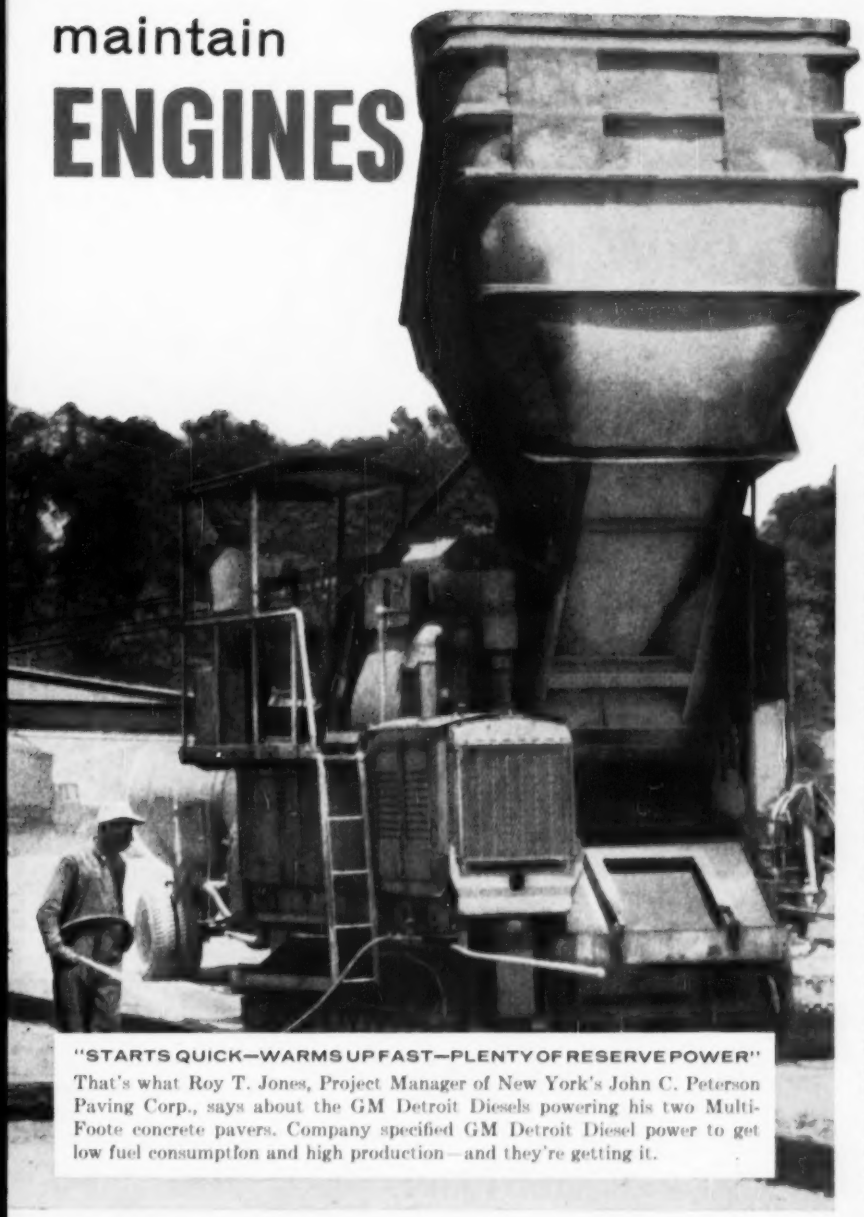
Excavating Contractor Russell F. Davis of Lafayette, Indiana, put this GM Detroit Diesel-powered Northwest 25 in service in 1947, has spent only $150 for repairs since. Now company owns three more excavators—all powered with quick-starting, fast-working GM Detroit Diesels.



"WE'VE STANDARDIZED ON GM DETROIT DIESEL"

Dependability, fast service, interchangeable parts—these are some of the reasons why Pennsylvania contractor, John S. Teeter & Sons, Inc., has standardized on GM Detroit Diesel power for crushers, pumps, generators and self-powered machinery.

maintain ENGINES



"STARTS QUICK—WARMS UP FAST—PLENTY OF RESERVE POWER"

That's what Roy T. Jones, Project Manager of New York's John C. Peterson Paving Corp., says about the GM Detroit Diesels powering his two Multi-Foote concrete pavers. Company specified GM Detroit Diesel power to get low fuel consumption and high production—and they're getting it.

Parts and Service

As Near as Your Telephone

Wherever your contracts take you, you'll find General Motors Detroit Diesel distributors and dealers ready to give you fast service and quick delivery of low-cost factory-engineered parts day or night.

For 165 GM Detroit Diesel distributors and dealers blanket the nation—still more are located in Canada and overseas—to help you keep your GM Detroit Diesels running right.

And when you call you get action, for these distributors and dealers know the need for speed on construction jobs—completion dates don't wait.

Typical of this speed is the experience of a contractor in West Virginia. He needed an engine overhaul on a scraper. His Detroit Diesel distributor had his scraper back on the job in two hours—because he pulled the engine and replaced it with a rebuilt unit, then took the original engine back to his shop for overhaul.

Another contractor hit subsurface water on an excavation—and his distributor kept the contract going by delivering GM Detroit Diesel-powered Wellpoint pumps in less than half a day.

And when you put your GM Detroit Diesel in the hands of your distributor's or dealer's servicemen, you're putting it in the hands of experts.

For they're factory-trained, know all the latest maintenance and repair procedures.

And they use factory-engineered replacement parts—the same parts, built to the same rigid specifications as the parts used in building GM Detroit Diesel engines.

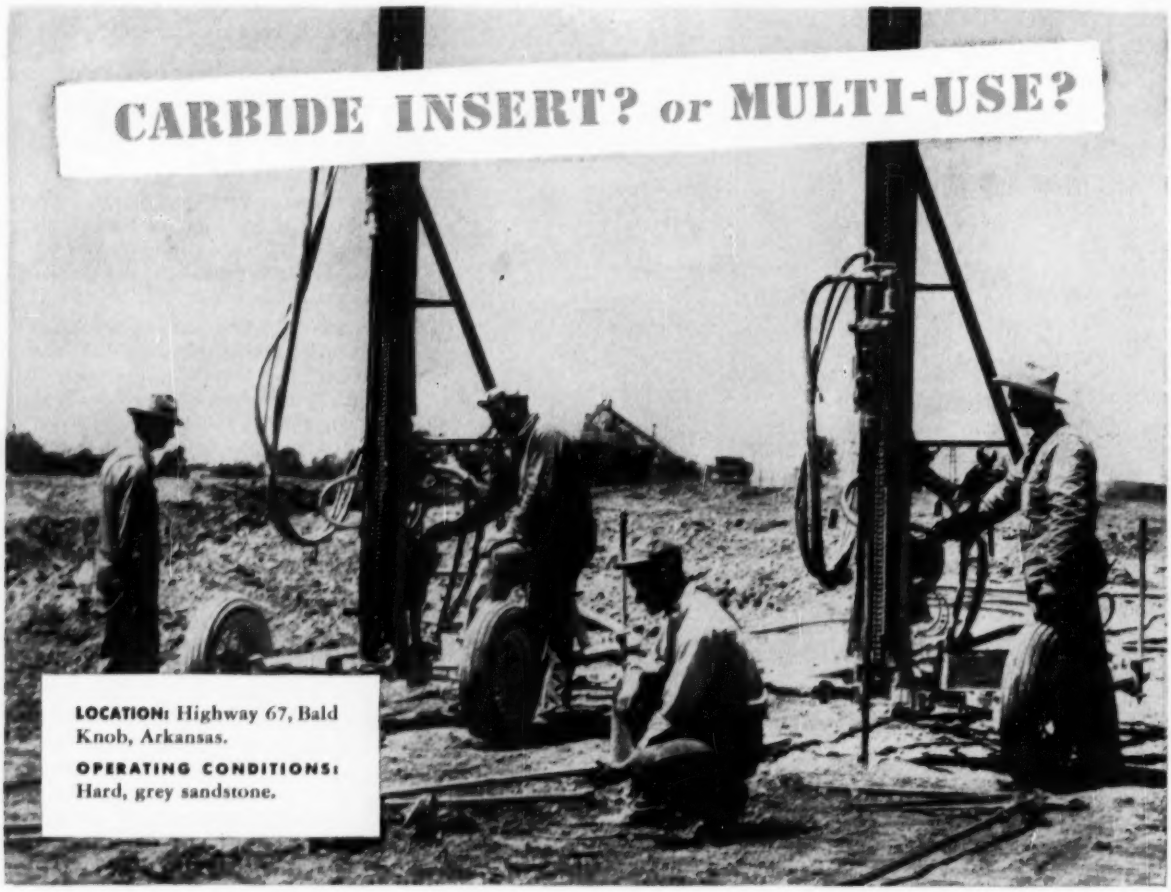
For full details on the parts and service behind your GM Detroit Diesel, call your local GM Detroit Diesel distributor or write direct.

CRUSHES 280 TONS ON 90¢ FOR FUEL

Minnesota gravel contractor P. O. Pederson switched from a 4-cycle Diesel to a GM Detroit 2-cycle Diesel several years ago, has specified GM Detroit Diesel in two more crushers bought since then. Company reports GM Detroit Diesels start easy, work fast.

WINS $1,143,835 JOB WITH GM DIESEL UNIT

This GM Detroit Diesel-powered Gradall's ability to do a faster job at less cost helped an Illinois contractor win a big contract in Oklahoma. In 400 days he cleared and grubbed 2,493,000 yards to widen and straighten a river and stabilize its banks.



Acme Material Co., Inc., gets lowest cost per foot of hole in hard grey sandstone with TIMKEN® multi-use bits

WAGON drilling through hard, grey sandstone, Acme Material Co., Inc., of Bald Knob, Arkansas, discovered that Timken® multi-use bits produced the lowest cost per foot of hole.

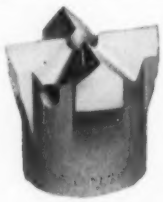
Dozens of other drillers use Timken multi-use bits for the same reason. These bits are the most economical for drilling in ordinary ground. With correct and controlled reconditioning, Timken multi-use bits give lowest cost per foot of hole when full increments of drill steel can be used.

But Timken multi-use bits aren't *always* your best bet. For hard, abrasive ground, use Timken carbide insert bits. They deliver highest drilling speed, and are most economical for extremely deep holes, constant-gauge holes, small diameter blast holes.

And don't forget this important money-saving advantage: Both Timken carbide insert and multi-use bits are interchangeable in the same thread series. A wide range of different Timken bits fit the same drill steel. Your men can change bits quickly, easily as the ground changes—right on the job.

Both Timken carbide insert and multi-use bits are made from electric furnace Timken fine alloy steel. Both have special shoulder unions that prevent drilling impact from damaging threads.

To find out which bit type will cut costs the most in your operation, call on the Timken Rock Bit Engineering Service. There's no obligation. Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken multi-use rock bit

Timken carbide insert rock bit

your best bet for the best bit ...for <u>every</u> job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

CONCRETE bucket is under finger-tip control of the operator of this 22-B Transit Crane. Boom is 80-ft. long with a 20-ft. jib. Booms are available with bolted butt-type joints (standard equipment) or pin-connections (extra equipment at added cost).

Here's Concrete Handling Speed For Your Long-Boom Jobs

You can count on Bucyrus-Erie Transit Cranes for speed and reliability on your long-boom concrete pouring jobs because they give you the kind of boom control you need for continuous up-and-down booming.

Boom hoist is instantly available. Boom angle can be changed while the machine is swinging, or while the load is being hoisted or lowered. All the operator has to do to change the boom angle is to engage the boom hoist lever and the boom starts to move — no need to shift gears or mesh jaw clutches.

Designed for safety, the Transit Crane boom hoist is a power-controlled lowering type that ties operation of the boom to the main machinery and limits speed in the lowering direction. It leaves the brake free for the final stop — the operator does not have to drag the brake all the way down. Heavy-duty boom hoist machinery has full ability to handle heaviest loads recommended for the machine.

There are many other features, which contribute to crane accuracy, and which Transit Cranes bring you as standard equipment. See your Bucyrus-Erie distributor now for full information on the 25-ton capacity 22-B Transit Crane, convertible to ¾-yd. excavator; and the 15-ton capacity 15-B Transit Crane, convertible to ½-yd. excavator.

204E56C

BUCYRUS ERIE

South Milwaukee, Wisconsin

STRUCTURAL steel erecting is a "natural" for the Transit Crane with its precision control. Four hundred tons of steel were set in four days by this Transit Crane at an industrial plant under construction in Erie, Pa.

ROCKFORD

FIRST

Using a new type friction material of recent development, ROCKFORD was the FIRST to engineer these new materials into MORLIFE Clutches and Clutch Plates. They reduce clutch size and engaging pressure, operate longer without adjustment or plate replacement — and avoid down-time caused by burned or warped plates in heavy duty tractors, trucks, tanks, cranes, power units, shovels, bulldozers, earth movers and other heavy duty machines.

MORLIFE* CLUTCHES and CLUTCH PLATES

*TRADE MARK

"MORLIFE clutch has gone 851 hours without slipping or adjustment."

"MORLIFE clutches last 950 hours longer, without adjustment."

"MORLIFE clutch needs adjustment once a month, instead of daily."

"MORLIFE requires lighter handle pull and one tenth the adjustments."

"MORLIFE clutch going strong after 1695 hours, working in sand."

"MORLIFE pulls harder and lasts six to ten times longer."

400% MORE LIFE

100% MORE TORQUE

50% MORE HEAT RESISTANCE

Before you approve specifications for your next models, it will pay you to investigate how MORLIFE Clutches will add to the service life of your product and reduce the number of stops for adjustments and repairs. It also will pay you to recheck specifications for your present models. For information covering operating characteristics, write Department E.

ROCKFORD Clutch Division BORG-WARNER

313 Catherine Street, Rockford, Illinois, U.S.A.

CLUTCHES

Reader Comment

It's an Old Trick

SIR—An item on the effectiveness of horse manure as a sealing material in a Columbia River dam appeared in ENR Feb. 23, p. 23. I sent this item to a friend of mine, who was formerly in the steam and hot water boiler business. His comment: It brought back memories of my boiler days. Long before the use of boiler liquids for leaky heaters, horse manure was frequently used to plug cracks in castings. In some way or other, it fused in the cracks and very often stopped the leakage.

FRANK KINGBURNE
McKeesport, Pa.

Flood Insurance

SIR—I have read with interest the editorial in ENR Mar. 1. It may well be that bills now being considered would, as you point out "encourage people to live on flood plains." However, is it not possible that this is a fault of the bill as drafted and should not be considered an indictment against all possible forms of flood insurance.

In "Floods" by Hoyt an Langbein (Reviewed by ENR July 14, 1955) it is clearly pointed out that flood insurance can be so written that it will have the effect of discouraging settlement on flood plains—an end result to which we can all subscribe. We feel that government-backed insurance, if properly drafted, can help to put a brake on the mounting cost of unwise flood-plain occupancy—a staggering cost now borne largely by you and me. To do so, it must provide that the cost of the insurance be borne by those who carry the flood hazard. That is to say, premiums must be paid in proportion to the flood hazard.

Any form of insurance by which the general public would carry the burden (apparently the present bill to which you object does this) would as you point out, worsen matters to the extent that it would give encouragement and assurances to those on flood hazard lands that their losses would be recompensed with little expense to them. Such a bill would penalize the provident against the improvident.

The cost of such flood insurance may be high, but if these costs are hydrologically sound, and the facts are available in the U. S. Geological Survey, Weather Bureau, and Corps of Engineers to make them so, then the premium notice would be an annual reminder of the cost of doing business on the flood plain or the dubious pleasure of living there. Those businesses that have a proper advantage in location on the flood plain could afford the premium, while to others, the insurance charge would be a powerful economic force to get out and stay out.

W. G. HOYT
Wingdale, N. Y.

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance.

Letters should be addressed: Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

Against Reclamation

SIR—I cannot agree that it is "good news for construction, and good news for the nation as a whole" for the Reclamation Bureau to be back in business (ENR Mar. 15, 1956, p. 148). Your feature article of the same issue regarding the structural steel shortage points up one of the many reasons why such activity will be detrimental to the nation's and to construction's best interests.

At a time of seriously adverse economic conditions there may be some justifications for such projects; but today when the nations economy is running at an all time peace time high and when construction materials are in short supply for vitally needed projects it is inconceivable that you should laud such additional "make work" projects.

I frankly cannot see where the construction of the Upper Colorado River Project means anything but bad news to the nation.

Rather than increase the Bureau's spending, a complete review of reclamation policy is in order. The feasible reclamation projects in the West are practically all built. In this connection I heartily agree with the last paragraph of your editorial wherein you say that Congress should have full knowledge of what its reclamation money is being spent for. Personally I don't believe in having the Bureau of Reclamation build municipal water supplies as in the case of Santa Barbara and Ventura Calif. or in having it construct works which are basically power projects as is the case of portions of the Upper Colorado Project and many others of the Bureau's projects. But if that is to be the case let's have Congress and the nation made fully aware of what is going on instead of masquerading these activities under the guise of reclamation projects.

NEVILLE S. LONG
Civil Engineer
Sonora, Calif.

Alternate Hangar Design

SIR—In the Mar. 1, 1956, issue of Engineering News-Record, you ran an article "Hanger Design Races to Keep Up with Planes," which particularly interests this organization, since we have been not only professionally concerned with the economics of hangar design for two decades but have also performed related consulting services for the Port of New York Authority over a period of the past seven years.

Our assignments included the design of Hangars 3, 4, and 5, Hangar 6, and the alternate design in prestressed concrete for Hangar 8. In 1949 we were retained to develop competitive hangar designs in steel and concrete in conventional and cantilever framing. Hangar 7, planned by the Port of New York Authority, is an adaption based on the studies presented in the report.

In discussing the alternate design to Hangar 8 in prestressed concrete, your attention is directed to the fact that the planning work progressed beyond the estimating stage, since complete bidding documents were available to contractors for a suspended steel cantilever as well as the pure cantilever in prestressed concrete. The low bid in structural steel by S. S. Silverblatt was $3,959,100. The low bid on the prestressed concrete alternate by the Corbetta Construction Company was $4,270,000. The difference of $311,000 is approximately the 8% which you quote in your article.

We believe that it would be of interest to the readers to know that although the bids were opened Feb. 23, 1954, months elapsed before an award was made and the necessary design changes were accomplished to eliminate the suspension system in the steel design. The additional cost for this work was approximately $150,000, bringing the difference to approximately 4% on the basis of similar framing systems in concrete and steel.

A further item of interest in this economic comparison is the fact that the Port of New York Authority felt

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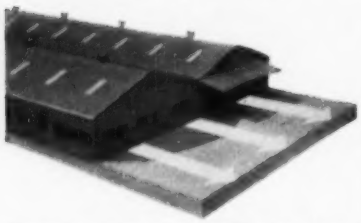

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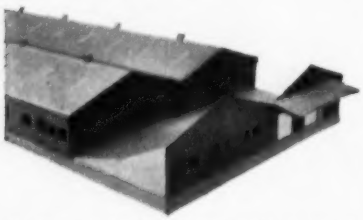

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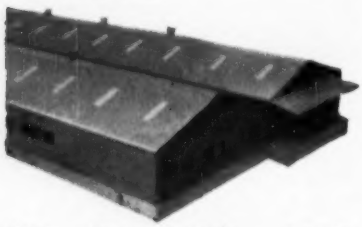

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the uniqueness of the prestressed concrete design involved certain risks, and it was required that, if an award was made on this basis, the contractor, at his own expense, would have to build one complete girder 380 ft long, containing 240 cu yd of concrete, and test this girder to destruction. The interpretation of the test would be determinative in the subsequent work under the contract. It was estimated that the cost of this investigation would be approximately $50,000. Since no such penalty was imposed in the case of the structural steel alternate, one might deduce that the final difference between the competitive designs was $100,000, with the concrete costing approximately 3% more than the steel. Such a difference certainly was less than the usual spread in bids and not by any means conclusive in establishing the economy of steel over concrete.

It had been suggested by this firm that a suspension system be used, since it was permitted in the structural steel design. This would have very substantially reduced the cost. The Port Authority took exception to this proposal. Apparently such suspensions will now be permitted if the writer properly interprets the remarks pertaining to hangars presently being planned in concrete.

Since this firm played a major part in the development of the designs which you discussed in your article and since the name of the firm of consultants presently preparing plans for a hangar not yet built was mentioned, we believe that there are good reasons why the name of our firm should have been given somewhere in the article.

ROBERT ZABOROWSKI
Vice President
Roberts & Schaefer Co.
Chicago, Ill.

Timber Buildings, Big Too

SIR—It was interesting to read the comments in your issue of Feb. 16 in regard to the 500 x 1000 ft aluminum-faced warehouse at Palmdale, Calif., and in the Mar. 29 issue in regard to the 560 x 1480 ft reinforced concrete warehouse at Toronto.

It is my opinion that too much emphasis is frequently given to size and other factors such as speed of construction. However, I wonder how many people know that there is a large one-story, wood-frame building at O'Hare International Airport, Chicago, Ill., that covers approximately 40 acres. The building is 2,991 ft in length and 829 ft wide for 1,362 ft of its length and 376 ft wide for the remainder of its length.

The framing consists of multiple-member wood connectored trusses supported on glued-laminated wood columns. It was constructed in 1943 as an aircraft assembly plant but is now used primarily as a warehouse. Since it was constructed during the war when information on such operations was not published, I doubt that any information in regard to its construction ever appeared in engineering literature.

JOHN A. SCHOLTEN
Engineer
U. S. Forest Products Laboratory
Madison, Wisc.

[EDITOR'S NOTE: Mr. Scholten is mistaken that nothing was published on this building. It was first pictured in ENR Mar. 11, 1943 vol. p. 334, and a 6 page article followed in ENR Oct. 21, 1943 vol. p. 624.]

CALENDAR

American Water Works Association, Diamond Jubilee Conference, Kiel Auditorium, St. Louis, Mo., May 6-11.

Sixth Highway Transportation Congress, Hotel Mayflower, Washington, D. C., May 8, 9 and 10.

Society of American Military Engineers, 36th annual meeting, Washington, D. C., May 14-15.

Purdue Industrial Waste Conference, Purdue Memorial Union, Lafayette, Ind., May 15-17.

American Institute of Architects, annual convention, Biltmore Hotel, Los Angeles, Calif., May 15-18.

Prestressed Concrete Institute, second annual convention, Hollywood Beach Hotel, Hollywood, Fla., May 16-18.

Society for Experimental Stress Analysis, spring meeting, William Penn Hotel, Pittsburgh, Pa., May 16-18.

Building Research Institute, annual meeting, Sheraton-Brock Hotel, Niagara Falls, Ont., May 21-22.

National Society of Professional Engineers, Ambassador Hotel, Atlantic City, N. J., May 23-26.

Concrete Reinforcing Steel Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., May 28-June 2.

Steel Joist Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., May 29-30.

American Society of Civil Engineers, Spring convention, University of Tennessee, Knoxville, Tenn., June 4-8.

Materials Handling Exposition, Cleveland, Ohio, June 5-8.

World Conference on Earthquake Engineering, University of California, Berkeley, June 12-16.

American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., June 17-22.

American Society of Landscape Architects, 57th annual meeting, Cleveland Hotel, Cleveland, Ohio, June 24-27.

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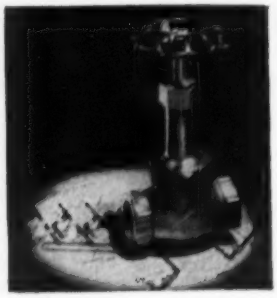

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Durham	Dillon Supply Co.
	Noland Company, Inc.
Fayetteville	Piedmont Supply Co., Inc.
	Standard Supply Co., Inc.
Gastonia	Gastonia Mill Supply Co.
Goldsboro	Dillon Supply Co.
Greensboro	Frank Hackett Supply Co.
	Piping & Equipment Supply Corp.
Hickory	Piedmont Supply Co., Inc.
High Point	Koster Machinery Co.
Rinston	Noland Company, Inc.
Raleigh	Dillon Supply Co.
	Noland Company, Inc.
Rocky Mount	Dillon Supply Co.
Salisbury	Piedmont Mill Supply Co., Inc.
Shelby	Shelby Supply Co.
Wilmington	Mill & Contractors Supply Co.
Wilson	Noland Company, Inc.
Winston-Salem	Koster Machinery Co.
	Noland Company, Inc.

OHIO

Akron	Mahoning Valley Supply Company
Canton	Mahoning Valley Supply Company
Chillicothe	Grinnell Company, Inc.
Cincinnati	The Murdock Mill & Supply Co.
Cleveland	American Rad. & Std. Sanitary Corp.
	Strong, Carlisle & Hammond Co.
Columbus	The Smith Bros. Hardware Company
	Westwater Supply Company
Dayton	The Acme Plumbing Supply Co.
	Dills Supply Company
Lancaster	The Buedel Hardware Co.
Lima	American Rad. & Std. Sanitary Corp.
Lorain	American Rad. & Std. Sanitary Corp.
Mansfield	Conte Plumbing & Heating Sup., Inc.
New Haven	New Haven Supply Co.
Sandusky	Brahl & Aupell Co.
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Chester	Hajoca Corporation
Easton	H. P. Kinsey Company
Erie	Palace Hardware Supply Company
Franklin	Jaffey Industrial Supply Co.
Harrisburg	Appleby Bros. & Whittaker Co.
Haverford	Plumbers Supply Co., Inc.
Lancaster	Herr and Company, Inc.
Lansdale	Hajoca Corporation
Norristown	United Pipe & Supply Co., Inc.
Philadelphia	Herman Goldner Co., Inc.
	Grinnell Corporation
	Hajoca Corporation
	Henry B. Pancoast Company
	C. J. Rainear & Co., Inc.
Pittsburgh	Pittsburgh Gage & Supply Co.
Pottsville	Reading Foundry & Supply Co.
Reading	Hajoca Corporation
	Reading Heater & Supply Company
Scranton	Ralph E. Weeks Co.
Sharon	Pittsburgh Gage & Supply Co.
Titusville	Pittsburgh Gage & Supply Co.
Wilkes-Barre	Eastern Pennsylvania Supply Co.
Williamsport	F. Reeter Company
York	Fulton, Mehring & Houser Co., Inc.

RHODE ISLAND

Providence	Allen & Reed Company
	Grinnell Company, Inc.
	Rhode Island Supply & Eng'ring Co.
Woonsocket	Woonsocket Supply Company

SOUTH CAROLINA

Anderson	Sullivan Hardware Co.
Charleston	B. L. Montague Co., Inc.
	Noland Company, Inc.
Clinton	Industrial Supply Co.
Columbia	Columbia Supply Co.
	Noland Company, Inc.
Greenville	Poe Hardware & Supply Co.
	Stewart Supply Co.
	Sullivan Hardware Co.
Spartanburg	Hall & Company, Inc.
	Noland Company, Inc.
Sumter	B. L. Montague Co., Inc.

TENNESSEE

Bristol	Mitchell-Powers Hardware Co.
Chattanooga	Mills & Lupton Supply Co.
Jackson	Southern Supply Co.
Kingsport	Greene Hardware & Supply Co.
Knoxville	Tennessee Mill & Mine Supply Co.
Memphis	E. C. Blackstone Co.
	H. O. Nelson Co.
Nashville	Buford Brothers, Inc.
	W. A. Case & Son Mfg. Co.
	Noland Company, Inc.

TEXAS

Austin	K & M Supply Company
Dallas	N. O. Nelson Co.
El Paso	Zork Hardware Company
Fort Worth	Well Machinery & Supply
Houston	Corbett Corp.
	N. O. Nelson Co.
Lufkin	Supply Div. of Lufkin Const. Co.
Marshall	E. B. Hayes Machinery Co.
Paris	Robert L. Swain Co.
San Antonio	San Antonio Pipe & Supply Co.
Texarkana	Buhrman-Pharr Hardware Co.

UTAH

Salt Lake City	H. O. Nelson Co.

VERMONT

Burlington	The Bladgett Supply Co., Inc.
Rutland	Conney-Plue, Inc.
St. Johnsbury	Chas. Miller & Son Co.

VIRGINIA

Charlottesville	Noland Company, Inc.
Danville	Hajoca Corporation
Lynchburg	Barker Jennings Corp.
Newport News	Noland Company, Inc.
Norfolk	Hajoca Corporation
	The Henry Walke Company
Richmond	Hajoca Corporation
	Industrial Supply Corporation
	Noland Company, Inc.
	Southern Railway Supply Co.
Roanoke	Graves Humphreys Hardware Co., Ltd.
	Noland Company, Inc.
Waynesboro	Mize Supply Company

WASHINGTON

Seattle	Northern Commercial Co.
	Steam Supply & Rubber Co.
Spokane	Northwest States Supply Co.
	Sullivan Valve & Engineering Co.
Tacoma	Paramount Supply Co.
Walla Walla	Drumheller Co.

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Charleston	McJunkin Corporation
Clarksburg	Osborn Machinery Co., Inc.
Huntington	Logan Hardware & Supply Company
Logan	Logan Hardware & Supply Company
Weston	Danser Hardware & Supply Co.
Wheeling	Trimble & Lutz Supply Co.

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Milwaukee	F. R. Dengel Co.
	B. Hoffman Mfg. Co., Div. Grinnell Company, Inc.
	Bundle Spence Mfg. Co.
Nekoosa	Nekoosa Fdry. & Mchne. Works, Inc.
Oshkosh	Battis Bros.
Racine	Thomas Supply Co.
Sheboygan	Oastenberg Iron Works
Watertown	Rusel Dairy Equipment Co.

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Vol. 156, No. 18 May 3, 1956

Number of copies printed this issue: 73,544

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THE CONSTRUCTION WEEK

ILLINOIS VS STEEL SHORTAGE—Threatened with critical delays in highway work due to the steel shortage, both the State of Illinois and the City of Chicago acted this week to substitute concrete designs.

The state's Toll Road Commission received bids for a four-span, precast, prestressed reinforced concrete test bridge, which may be the prototype of some 200 structures (ENR April 19, p. 19). W. E. O'Neil Construction Co. submitted the lowest bid; offering to complete the 226-ft structure ready for testing in 45 days, at a guaranteed maximum cost of $155,000. Designed for assembly-line construction, this test bridge reportedly will cut construction time by 75% and save $5 million over conventional cast-in-place concrete designs, if adopted as standard for the other 200 bridges in the program.

Chicago opened bids this Monday on concrete-filled pipe piles for the substructure of the Calumet Bridge and approach spans, after postponing the bidding a week to permit revision of design drawings and contract specifications for structural steel piles. The city wanted to take no chances on a bottleneck in bridge construction, which also would delay completion of the Calumet Skyway project.

LEGAL STALEMATE—In a court test of the wide powers exercised by traffic Director Henry A. Barnes in trying to solve Baltimore's traffic problems, only one was invalidated: The court held that he has no authority to set speed limits on streets that are linked with federal and state highway systems. Trouble is that existing laws also prevent the state from setting speed limits in incorporated areas. So the matter will have to be dumped into the lap of the state legislature at its next session.

FALSE ECONOMY—"The wide fear of overestimating future office needs, in the name of economy, is now proving a boomerang to a large number of corporations," declares Norman Tishman, president of Tishman Realty & Construction Co. Inc. of New York. There's a tendency on the part of corporations, he said, to overlook the fact that industrial expansion usually brings with it the need for larger administrative quarters.

RUSSIAN TOUR—Arrangements have been made for 16 U. S. representatives of the homebuilding industry to tour the Soviet Union for 30 days beginning June 15. Joseph B. Haverstick, president of the National Association of Home Builders, which sponsored last year's visit of Russian housing experts to this country, has expressed confidence that the American delegation will get free access to information on Soviet housing techniques and materials.

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

SUPERIOR QUALITY of INNER RACES

The function of an inner race is to provide a fatigue-resistant surface between a shaft and the bearing rollers. Because of roller bearing geometry, there is a smaller area of contact between inner race and rollers than between outer race and rollers. This concentrates more load on the inner race and makes it the critical member from a fatigue life standpoint, particularly when the inner race is the stationary member and maximum load is repeatedly applied at one point.

Since it is vital to good performance that the inner race does not work loose on the shaft, HYATT inner races are designed for relatively heavy press fits, so the inner race becomes an integral part of the shaft for all practical purposes. Other advantages of HYATT'S carburizing process and precision finishing operations are briefly explained at right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your design requirements. Remember, HYATT is America's *first* and *foremost* maker of roller bearings. Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.

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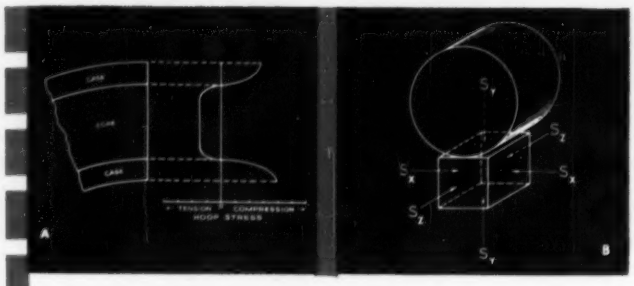
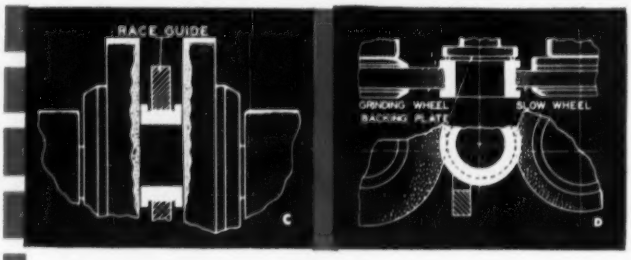
ROLLER BEARINGS



1. WHY CARBURIZING?

Carburizing provides inner races with tough cores, and flanges that will not crack, with no loss of case hardness. This permits tight press fits and also improves load-carrying capacity as shown in Diagram A. During quenching, a volumetric change tends to stretch the core and compress the case. Due to the Poisson effect, the compressive hoop stresses in the external fibres build up the load-carrying capacity.

Diagram B shows a typical element under roller load. Stresses in the "Z" direction are negligible; those in the "X" direction are compressive hoop stresses or pre-load. Those in the "Y" direction are compressive stresses due to the load. Without the compressive stress Sx (hoop stress) the load capacity would be reduced; and if "X" were a tensile stress due to pressing a through-hardened race on a shaft, the bearing capacity would be still less.

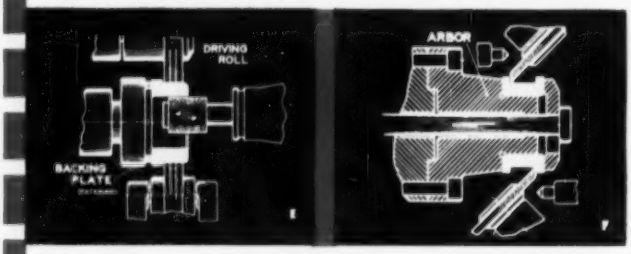


2. DOUBLE END GRIND

In grinding a HYATT inner race, the ends are first faced off square and parallel so they can be used as accurate reference during subsequent operations. The HYATT double end grind process (Diagram C) insures excellent control of parallelism.

3. CENTERLESS PATHWAY GRIND

Centerless grinding was pioneered by HYATT years ago, and eliminates excessive wall variation due to spindle and chucking errors. This method produces as nearly a perfect cylinder as is commercially practical. Two-point and three-point out of round and taper are held to a minimum. Note how work is rotated with backing plate against previously ground end (Diagram D) to insure accuracy.



4. CHUCKLESS BORE GRIND

Here the centerless method assures a bore concentric with the pathway, with minimum wall variation, by removing stock from high spots as they pass between drive roll and related grinding wheel (Diagram E).

5. FLANGE GRINDING

To assure that they will run true with roller pathway, flange faces are also ground using the squared ends for reference (Diagram F). This establishes even contact with roller ends during bearing operation.

WASHINGTON OBSERVER

The Corps of Engineers is preparing to train men to become atomic engineers—the technicians needed to operate and maintain military nuclear power plants. Now beginning a course at the University of Virginia are one civilian and 34 military men—from Army, Navy and Air Force.

These 35 will become instructors at Ft. Belvoir where the Engineers have under construction a "package" atomic reactor—designed to provide heat and power in locations where other fuels are uneconomical. The reactor is scheduled to be completed next summer—which is when the Engineers plan to start training men to operate and maintain similar power plants as they are built.

•

The House has moved to assure no shutoff of housing credit to veterans. Last week the House approved an extension of a veteran's right to VA loans and loan guarantees beyond the July 25, 1957, deadline.

The measure provides that applications in before the deadline are to be processed providing they are backed up by a purchase contract with a builder or seller.

The effect is to extend the deadline for several months to a year. Congressmen want to make sure no veteran loses any rights—and this amendment, tacked onto a bill wrapping up several technical changes favoring the veteran home-buyer, gives Congress additional time to pass a specific measure extending these GI rights.

Senate acceptance of the House measure seems certain—and the guessing is that there will be no veto.

•

Pooling Columbia River power revenues to build more irrigation projects has been suggested by the Budget Bureau as something that the Administration and Congress should consider.

Similar accounting in the Missouri and Central Valley of California makes it possible to find proposed irrigation projects "economically feasible" that otherwise might not pass the test.

The $6-million Crooked River project in Oregon is the source of the suggestion. If it gets power revenues from The Dalles it can be found to pay out.

Bureau of Reclamation and Bonneville Power will make a recommendation to the Secretary of Interior in about a month. The states involved will have a chance to comment before any recommendation goes to Congress.

•

Backers of a federal Hell's Canyon high dam haven't given up—even though the Idaho Power Company has its project underway.

They have hopes of log-rolling some votes in both House and Senate which would get the high dam bill out of the Interior Committees. They would like to pull another Dixon-Yates—cancel the grant to a private power company in favor of public power.

Key man in the Senate is Long of Louisiana who reportedly blocked Senate committee action last year. Now the federal dam bloc feels they may be able to swing him to their side.

Frying Pan Arkansas Trans-Mountain diversion project is involved on the House side. There, the hope is to get Hell's Canyon support from congressmen who want the Frying Pan Arkansas project, which is now pigeonholed in the Rules Committee.

All this maneuvering is a long shot but it keeps politics alive on the Hell's Canyon-public power issue.

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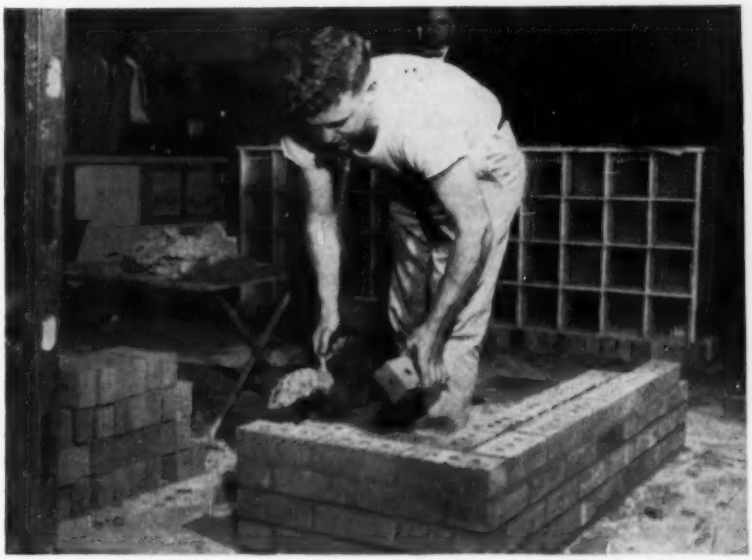
Apprentices:

Enough for now—in many cases—but it's time for the booming construction industry to take stock of its programs for . . .



The Training of Tomorrow's Craftsmen

Charles J. Harding
Associate Editor

The kid down the street—your son, perhaps—is one of the biggest challenges facing the construction industry today. As the journeyman of the future, he's the one who'll keep the wheels of the industry turning—if you can attract him, if you can train him and if you can keep him.

Although the construction industry has led the apprentice parade for many years, it now has only 100,899 registered apprentices in training; some 20,000 still aren't registered, despite the availability of a national program; and it needs at least 200,000 according to present estimates.

Here are some highlights of the situation as reported to ENR last week:

• **Some debits**—The bricklayers, one of the biggest apprenticeship leaders of all, need a ratio of one apprentice to every 10 journeymen—they're now training at the rate of 1 to 11 and last year had some 215 inactive local joint apprenticeship committees. Carpenters—replacing about five-twelfths their normal losses—have fallen from 32,120 apprentices in 1950 to 23,750 today. The electrical industry needs 20,000 apprentices—has registered only 16,184. Plasterers are shooting for 1 to 4—are training only 1 to 9. Ironworkers have no national Joint Apprenticeship Committee; lathers no national standards.

• **Some credits**—Stone cutters have balanced their needs since 1953. Elevator constructors are training at a rate of 1 to 1 under a highly coordinated and successful helper program. Bricklayers' national JAC has urged a ratio of 1 to 5—the trade has turned out 49,000 apprentices since the war and reduced the average age of journeymen from 56 to 47. Painters, plasterers, roofers, and glaziers have recently revised their national standards. The plumbers' union has instituted an intensive training course for instructors in the plumbing and pipefitting trades at Purdue. By last year, over 500 JAC's had started journeymen training programs. The Structural Clay Products Institute has just developed a correspondence course for bricklayers. The electrical industry has one of the answers to a strong program: A national apprentice training director (Bill Damon).

By adding only 15 new craftsmen a year for every 17 we lose, the industry is failing to meet even the needs of a static economy. It's not preparing for the rising demands of an expanding population, for the future needs of a booming industry. It's not keeping abreast of the rapid changes that follow on the heels of new industries, materials, methods and techniques.

• **The spotlight**—Last week, as part of a national effort to awaken interest at the grassroots level, where the real solution to the apprenticeship problem lies, labor and management of the construction industry participated in three events:

• At the Union Industries Show in Seattle, Robert Neasham, 22-year-old apprentice from Santa Clara, Calif., was crowned Champion Bricklayer Apprentice of 1956. Competing on the basis of skill and speed against 37 other contestants from the United States and Canada, he won a cash award of $500 and a vacation in Boca Raton, Fla.

• At the same exposition, the carpenters union simultaneously held its first state-wide apprentice contest. For his skill in framing a wall—sheathed and insulated—and in hanging the door and fitting the sash, Frank Burger of Bellingham won the carpenters' laurels. And Bob Niemi of Tacoma took the millmen's award for his skill in building a kitchen cabinet.

• And back on the East Coast, representatives of management and labor, and state and federal officials gathered for the Twelfth Annual Eastern Seaboard Apprenticeship Conference.

(*Continued on page 22*)

. . . Training tomorrow's craftsmen

Meeting for three days in the rambling New Ocean House in Swampscott, Mass., they discussed the monumental problem of training apprentices.

• **Some challenges**—Taking as their theme "Our Future Depends on Our Skills," those at Swampscott took a look at current progress in the light of future demands.

They saw behind them the day of the old master builder, ahead of them the era of the highly trained craftsman and technician, many of whom will become our future foremen, superintendents, engineers and contractors. In automation, they saw a bold challenge to the electrical industry, and in the field of nuclear power the promise of swift changes in the plumbing and pipe-fitting trades. In the rapid expansion of air conditioning and refrigeration and in new competitive building materials and techniques they saw a pressing need for greater activity in apprentice training by all the apprenticeable trades.

Emphasis was on the need for higher entrance requirements, more careful selection, more thorough training, closer supervision, and on the ever constant problem of getting able and competent instructors. Interest was shown in the younger more amenable apprentice—the youth unburdened by family obligations and heavy financial commitments. Consideration was given to the industry's moral responsibility to provide opportunities for the nation's young men and to make the period of apprenticeship—which covers the most important and formative years of one's life—both fruitful and attractive.

And on this phase of the problem, one of the interesting sidelights of the conference was attendance by three outstanding apprentices—John A. Kelley, Raymond Birmingham and James McCarren—of New York City's IBEW Local 3 as guests of the National Electrical Contractors Association.

Among the suggestions that were made to meet some of the specific problems existing in local areas were these: A strong and active JAC with a training director where possible; post graduate courses for apprentices and training classes for journeymen; wider-area training programs; apprentice seniority as to layoffs; daytime schooling and overassignments in homework; use of graduate apprentices as instructors; related training in the slack winter months; and premium pay for higher skills. The need for a sound financial program was emphasized and use of collectively bargained joint contributions was suggested by some; a few felt the apprentices themselves should contribute, as they do in Philadelphia's IBEW Local 126.

Weak spots in the training of apprentices were canvassed and the biggest criticism was leveled at the breakdown in rotation, contractor resistance to using apprentices, and the prevalence of "lip service" to training programs.

• **Highly complex**—That the Swampscott conference did not attempt to come up with any formal recommendations and solutions was inevitable. There's no single approach that lends itself to universal application in all details. Part of the weakness and some of the strength of the training program in the construction industry is that each effort is necessarily tailored to fit local needs and inclinations.

The list of those directly affected by what the industry does—or fails to do—in the promotion of apprenticeship training is itself appalling. Take a look:

• On the labor side are the multiplicity of crafts embraced in the jurisdiction of 17 of the 19 building trades with apprenticeable crafts. These are made up of thousands of local unions—all autonomous, all ruggedly individualistic, all with different local problems, policies and attitudes, and many with conflicting jurisdictional interests. With their ranks are courageous leaders and dedicated servants—and there are some who jealously guard their personal future and resist the new at the risk of diluting—and perhaps of losing—their skills.

• On the management side are a host of heterogeneous contractors, general and special, big and small, who must, above all, provide the employment to which training is tied. Some operate at home, others far afield. Some have the work (more or less steady than others) and the facilities that will support apprentice training, others don't. Some are making herculean contributions to the job of training tomorrow's craftsmen, others sit back and "let George do it," getting what they need by sponging and pirating.

• Along with the contractors are the manufacturers and producers and suppliers of building materials—a host of firms and individuals whose ultimate success depends on the welfare of the contractors whose future rests, in turn, on the quantity and quality of its craftsmen.

• And beneath it all is the public interest—an interest in the education and welfare of its youth, and in getting quality products and workmanship at reasonable costs.

Although the training of apprentices is the joint responsibility of labor and management, experience has proved that the cooperation of all is essential. It is also agreed that the system should be voluntary, free of government regulation and compulsion—and also free from the dictates of those in the higher eschelons of the same craft or industry.

• **The national program**—It's against this background and on this premise that the national program was conceived.

Until Congress passed the Fitzgerald Act in 1937 to promote the training of apprentices, the system was whatever the unions and employers, individually or jointly, devised. The ancient form of indenture had fallen by the wayside and immigration restrictions had closed the door to the skills of Europe. Programs launched to meet the needs of the postwar boom had collapsed in the depression and the main stimulant on the scene was the Federal Committee on Apprenticeship, created in 1934 as part of the NRA.

Out of the Fitzgerald Act came the U. S. Labor Department's Bureau of Apprenticeship. Now headed by W. F. Patterson and with M. M. Hanson as National advisor for the Construction Industry, it is the only coordinating agency on the national level to assist cooperating groups in

Registered Apprentices

In all industries: 174,000	**In construction: 100,899**		**Percent: 57.7**
In selected building trades:	**1950 ***	**1954**	**1955**
Carpenter	32,120	22,568	26,248
Electrician	15,787	16,136	17,022
Painter & Paperhanger	5,655	3,932	4,610
Plumber & Pipefitter	22,253	20,062	21,637
Sheet Metal Worker	9,661	9,664	10,757
Trowel Trades	15,659	11,001	12,679
Totals	**101,135**	**83,363**	**92,953**

* U.S. Dept of Labor figures for June 30. Rest are for Dec. 31, 1955, except where noted.

the voluntary formulation, registration and conduct of apprentice training programs. Assisting it are the Federal Committee on Apprenticeship and the General Committee on Apprenticeship for the Construction Industry.

Other groups cooperating in the program include state apprenticeship agencies now established in 28 states, federal, state and local vocational offices, and state and local employment services.

Under their leadership, minimum apprenticeship standards have been adopted and a standard training program—combining on-the-job training with related classroom instruction—has been recommended.

Such a program for any of the apprenticeable trades should embrace:

- Formation of a local joint apprenticeship committee (JAC), equally representing labor and management, to launch and conduct the program.
- A written agreement indenturing the apprentice—who should be 16 or over—to the JAC, not to the union or the employer.
- Organized related classroom instruction—usually 144 hours a year.
- A progressively increasing wage scale. (The percentage system is considered preferable. Last year, the average was 46% of the journeymen rate to start, increases every 6 months, and 87% of the journeyman rate during the final period. Many do use flat rates, and apprentices in New York's IBEW Local 3, for example, negotiate their own.)
- Registration of the program and of the apprentice with the state apprenticeship agency or the Federal Bureau.

Most of the trades have established national standards that are updated from time to time, and a national JAC, which represents the international union and national contractor and supporting manufacturer associations involved. Major task of the national JAC's is to promote, stimulate, guide and assist activity at the local—and still autonomous—level.

- **Merits, incentives**—Hailed as the best device to achieve uniform action and greater participation, use of the program cuts off the path to "back door" entry into the building trades, facilitates rotation on the job and among employers, giving more balanced training, and, through use of uniform standards, gives some assurance that new journeymen in different locals will possess substantially the same degree of skill.

In addition to the natural incentives the program offers, the government has added a few of its own:

- Under the Davis-Bacon Act and related prevailing wage laws, apprentices employed on federal construction projects must be registered.
- JAC's are recognized by the VA as approved training institutions for GI benefits. (Unions are not, unless the employer guarantees steady employment.)
- Registered programs can be certified to Selective Service for deferment purposes.
- Federal income tax regulations allow as a deductible expense employer contributions to JAC funds, where collectively bargained.

- **Some solutions**—The immediate and continuing task is generally conceded to be that of promoting interest at the local level, where the controlling decisions are made.

Efforts in this direction have been undertaken by the AGC, which is active on both federal apprenticeship committees and in the national programs of the bricklayers, carpenters and cement masons. It has expanded its national Apprenticeship Committee, has set up subcommittees in 12 districts, and is considering establishing an AGC Department of Apprenticeship. Forward steps have also been taken by the National Association of Home Builders, which has appointed a five-man subcommittee on apprenticeship, is developing a model training program for guidance of local groups, and is servicing all of its local associations with an apprenticeship newsletter.

Besides the bricklayers and carpenters, groups which use the contest form of promotion include the sheet metal workers, painters and the plumbing trades. The plumbers' union has already scheduled its Third Annual International Apprentice Contest and Teacher Training Course for the week of August 6 at Purdue.

The program of regional conferences, with greater emphasis on employer participation, will be continued. The Southern Conference will meet in Biloxi, Miss., July 5-7, and the Eastern Conference will meet in Maine next year.

Continuing emphasis will be placed on appropriate completion ceremonies, both to accord the graduating apprentices the recognition their achievement merits and to awaken public interest in the training programs. As a supplement to the traditional graduation ceremonies and banquet, the Building Construction Employers' Association of Chicago, for example, is now giving each of the Chicago graduates replicas of the Declaration of Independence, the U. S. Constitution, the Bill of Rights and Lincoln's Gettysburg Address.

And in the field of solutions, two eloquent examples of the industry's ingenuity are the itinerant training programs established in Wisconsin and Michigan to overcome the difficulty of giving related classroom instruction to geographically scattered apprentices. The Michigan program, under the coordination of Andrew Virtue of the bricklayers' Local 31, covers all of the state outside of Detroit. It has nine itinerant instructors—two each for bricklaying and stone masonry, plumbing and pipefitting, and carpentry, and three for the electrical trade.

But as numerous and diverse as the present obstacles are, the ultimate goal is this: An adequate number of versatile, thoroughly trained craftsmen, in step with the times and capable of more economical, longer lasting and perfectly executed work.

An Area of Shortage Is Singled Out

John Volpe, Massachusetts Commissioner of Public Works, predicted that general contractors will have a difficult time manning the jobs that will stem from the multi-billion-dollar highway program now before Congress. Speaking at the Eastern Seaboard Apprenticeship Conference in Swampscott, Mass., he singled out operating engineers and carpenters as areas of critical shortages and stressed the need for apprentice training in the highway and heavy construction field, where the far-flung nature of the construction operations of such contractors is the biggest deterrent to the use of apprentices.

He offered two suggestions: Stimulation of greater contractor interest and union extension of the jurisdiction in which apprentices can work.

John Volpe

With House passage of the multi-billion-dollar bill for . . .

Highways: It's Now Up to the Senate

Having handsomely cleared its first hurdle, the multi-billion-dollar federal highway program faced two more major obstacles—Senate action, and, later, a House-Senate Conference Committee.

Principal interest—after the bill won a smashing 388 to 19 victory in the House—now lies in what the Senate will do in reconciling the new bill (the Fallon Bill) with a measure (the Gore Bill) that the Senate had approved at last year's session, and which is still on the books for action.

The betting is generally on the optimistic side—influential senators are already predicting that the version the Senate finally approves will call for as much construction as does the Fallon Bill. In that case, the federal government will become the biggest single factor in highway construction, with a share totaling about $37.6 billion, with the states raising about $14 billion, for a total of $51.6 billion.

Briefly, the House-passed Fallon Bill:

- Sets up a 13-year construction program, with a 16-year tax program to provide the full federal share of the cost.
- By 1969, gives the U.S. a limited-access, 40,000-mi superhighway network; and revamps and reconstructs the primary, secondary and urban networks to acceptable standards by the early 1970s.
- Supplies money for the interstate system on a matching basis of 90% federal, 10% state. Money will be apportioned to states in the ratio which the estimated cost of completing the interstate system in each state bears to the estimated total cost of completing that system in all states. (Thus, if a state's unbuilt interstate mileage cost 10% of the total money needed to build the total system: the state will get 10% of the total money.)
- Provides $37.6 billion in federal funds—$25 billion to be applied to the interstate system, $11.4 billion for primary, secondary and urban roads; $1.2 billion for public domain roads. Allocation of the funds for the interstate system to start at $1.2 billion for 1957, step up to a peak of $2.3 billion in 1964 and 1965, then work down to $1 billion for the final year.
- Specifically authorizes federal funds for primary, secondary and urban roads for only three years: $725 million for 1957; $750 million for 1958 and $775 million for 1959. Then, the bill calls for Congress to increase the total authorization by a minimum of $25 million each year for the next ten years.

- **Points of difference**—The big question is now what action the Senate will take. The Senate-approved Gore Bill calls for an annual rate of construction somewhat less than the $51 billion the House approved. Specifically, it provided only a five-year program, to cost $18 billion, and carried no provisions for higher taxes.

The course for the new Fallon Bill will be this: First, to the Senate Public Works Committee; then to the Senate Finance Committee; then to the Senate floor for debate, amendments and vote. Thereafter, if differences with the House measure remain, to a conference committee, thence back to both houses for final action.

Here are the major differences between the Senate-passed Gore Bill and the House-passed Fallon Bill that must be ironed out before a highway program will clear Congress:

- **Reimbursement to states for toll-roads and freeways.**

The Fallon Bill says it is the "intent" of Congress to pay states for roads built after August 2, 1947, less depreciation, ect., provided they meet the interstate standards. This language compromises the position of the highly populated eastern states that have tollroad programs, who want credit for what they have built, and other states that would not so benefit from such credits. The bill provides studies on the matter, leaves final decision on credit for these highways for later Congressional action.

The Gore Bill makes no provision for reimbursement to states on tollroads or freeways.

- **Adoption of the Davis-Bacon Act for the interstate portion of the highway program.**

The Fallon Bill calls for the Secretary of Labor to set prevailing wages for construction of interstate roads.

The Gore Bill does not carry the Davis-Bacon provision.

- **Apportionment of federal money for the interstate system.**

The Fallon Bill would divide the money between states on a basis of need; give states the same percentage of total interstate money as a state's unbuilt interstate mileage is to the total nation-wide unbuilt interstate mileage.

The Gore Bill calls for using the traditional formula based on area, population and mileage for apportioning this interstate money.

- **Federal reimbursement to states on the cost of relocating utility facilities.**

The Fallon Bill would reimburse those states that pay for this on the same basis as is being done for the project under construction. 90-10 if it is on interstate roads, 50-50 for others.

The Gore Bill calls for states paying for utility relocation costs to be reimbursed with federal money on a 50-50 basis, but such reimbursements can't go over 2% of a state's total interstate money.

- **Allocation of money for primary, secondary and urban roads.**

The Fallon Bill takes the present allocation of $700 million for these roads, and increases it $25 million each year for the next three years, then declares it to be the intent of Congress to keep stepping up this money by $25 million for the remainder of the 13-year period.

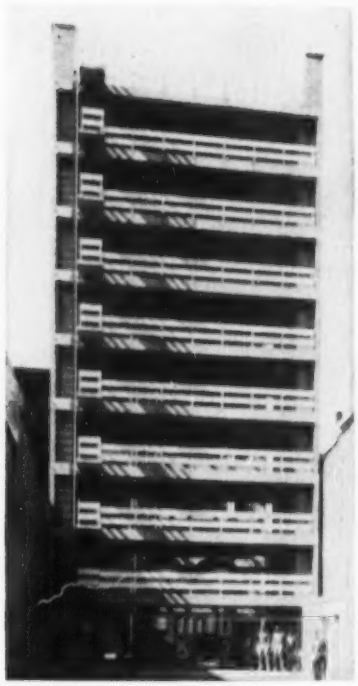
The Gore Bill provides for states to get $900 million in federal-aid money for the entire five-year period.

- **Size and weight restrictions on trucks.**

The Fallon Bill puts axle weight—but not gross weight or dimensional—restrictions on trucks. States won't get federal money if they increase axle weight limits over those in effect July 1, 1956, or allow trucks to operate with weights in excess of 18,000 lb carried on any one axle, or 32,000 lb on tandem axles; states can use whichever weight limit is greater.

The Gore Bill calls for complete size-weight restrictions on vehicles, including gross and dimension restrictions.

Money from user taxes will go into a sort of highway construction trust fund to be set up beginning July 1, 1956. Money from existing user taxes, plus increases will go into the fund to be doled out through the years. Tax increases that contribute include: Gasoline, diesel and special motor fuels, up from 2 cents to 3 cents a gallon; tires from 5 cents to 8 cents a pound; a new tax on camelback retread material of 3 cents a pound; excise tax on trucks, buses, and trailers from 8% to 10% of manufacturer's price; and a new federal annual registration fee of $1.50 per thousand pounds on trucks whose combined truck-plus-load weight exceeds 26,000 lb. The rate is $1.50 per year for each 1000 lb of such "taxable gross weight." (Defined as weight of truck plus its maximum load customarily carried).



Record Breaker

10-story garage erected by lift-slab method

The record for height and number of stories erected by the lift-slab method has once again been topped. A 10-story, 77-ft high pigeon-hole parking garage has been completed in Cincinnati for Citizens Security Corp.

Previous record holders were six stories high and ranged up to about 70 ft above grade (ENR Mar. 29, p. 6; Feb. 2, p. 43; and April 28, 1955, p. 26). An 8-story lift-slab building under construction in Cleveland has not yet been completed, because it tilted excessively out of plumb before slab-column connections could be welded. (See adjacent article on corrective measures being taken.)

The new record holder consists of two independent structures between which will operate an elevator that can move both horizontally and vertically, for parking cars. Total capacity of the garage is 80 automobiles.

Each section is about 20x34 ft in plan. The 10 reinforced concrete slabs, which were cast on the ground and then lifted into place by jacks atop the columns, are hollow-core, 16 in. thick, and weigh 48 tons apiece.

Rods extend from the jacks to steel lifting collars in the slabs around each column to raise the slabs.

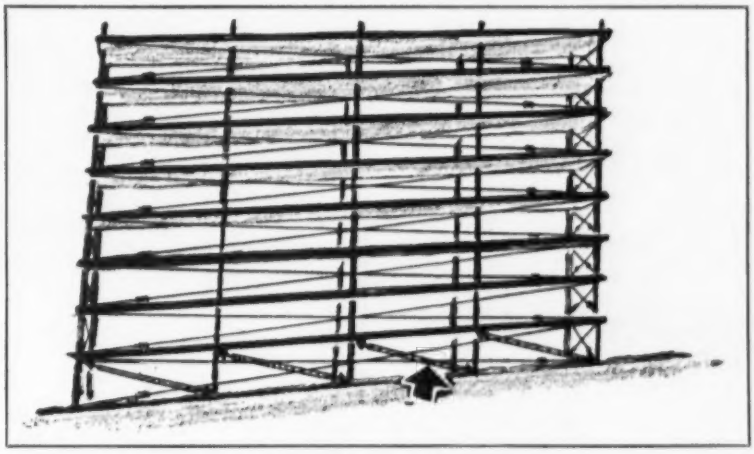
Each slab is supported on four steel columns. Spaced 16 ft apart transversely and 30 ft longitudinally, the columns are hollow squares, made up of two 8x8-in. angles. They were erected in two lengths, the lower being 43 ft. Slabs for the upper stories were jacked to the top of the first tier, before the second length of column was erected. The slabs were raised at a rate of about 4 ft per hour.

Central Lift Slab Co., Cleveland, Ohio, is the lifting contractor, with Bruno H. Thiel as general superintendent. Pigeon Hole Construction Co., Youngstown, Ohio, is the general contractor. R. M. Gansert and Associates, Cleveland, are the structural engineers.

Ferry Sale Paves the Way For Virginia Bridge-Tunnel

Purchase agreements have been signed, committing the Chesapeake Bay Ferry Commission to pay $13 million for the facilities of the Virginia Ferry Corporation, thus paving the way for construction of a bridge-tunnel crossing of the Chesapeake Bay between Kiptopeke Beach and lower Virginia peninsula (ENR Mar. 29, p. 32).

Engineering and feasibility surveys for the crossing will be financed by part of the $20-million bond issue that will be used for the purchase.



Jacks between columns (arrow) . . .

Plumbing Tilted Garage

Work began Monday on the straightening of the 8-story lift-slab parking garage in Cleveland, Ohio, that tilted 7 ft out of plumb in the early morning of April 7. The contractor placed jacks against the columns in the first story to push them back into the vertical.

The garage consists of two independent sections, each 91x21 ft in plan, between which elevators for parking cars will operate. The concrete floors in each section are supported on ten 61-ft high steel columns arranged in two rows. Spaced 22 ft c-c in each row, the columns are 8-in. square hollow sections, reinforced internally at the bottom against bending in the transverse direction. The concrete slabs are 8 in. thick and weigh 90 tons apiece. Floor-to-floor height is 9 ft in the first story, 7 ft 4 in. above (ENR April 19, p. 25).

• **Connections not completed**—After the close of work on April 6, the eight slabs of one section had been wedged in place, but none of the connections between steel collars in the slabs and the columns had been welded. Winds that blew that night are reported to have been responsible for shifting the structure out of plumb.

William D. Guion, Cleveland Building Commissioner, insisted that the structure be immediately shored to prevent collapse. This has been done. For the full height of the building, 8x8-in. timbers have been lashed to each column. In addition, in the first five stories, two 12x12 posts, spaced 4 ft c-c, have been placed on either side of each column. These are seated on 12x12 sills and 4x12 plates to distribute the load. Also, steel cables have been placed diagonally in each story between end columns.

• **Straightening method**—To plumb the columns, the contractor is jacking diagonally between top and bottom of successive columns in the first story.

Calculations indicate that stress in the columns has not exceeded the yield point; so those members may not have to be replaced. However, the Building Department may require them to be reinforced.

Flood Threat

Precautionary work rushed on Columbia River system

A serious flood threat could be made good on Columbia River Basin streams during the next 60 days. Extent of damage depends on the weather: how quickly mountain snowpacks melt and how much rain falls. Warm, clear days and cool nights will result in slowest runoff. A general warm spring rain could be disastrous.

Federal agencies already have taken steps to minimize flood crests.

First step is manipulation of the level of Lake Roosevelt behind Grand Coulee Dam. Initial draw-down to make space for the expected record flow was ordered April 21. It created an artificial flood stage in the Lower Columbia at Portland, Ore., and Vancouver, Wash. By April 25 the Columbia touched 18 ft at Portland, flood stage there, then edged lower.

The manipulation of Grand Coulee may shave as much as 9 to 12 m. off the crest in the populated lower river stretches which took the brunt of punishing river punches in the disasterous high water of 1948. The May-June runoff that year slammed the war-built city of Vanport, Ore., out of existence in a few minutes on the afternoon of Memorial Day.

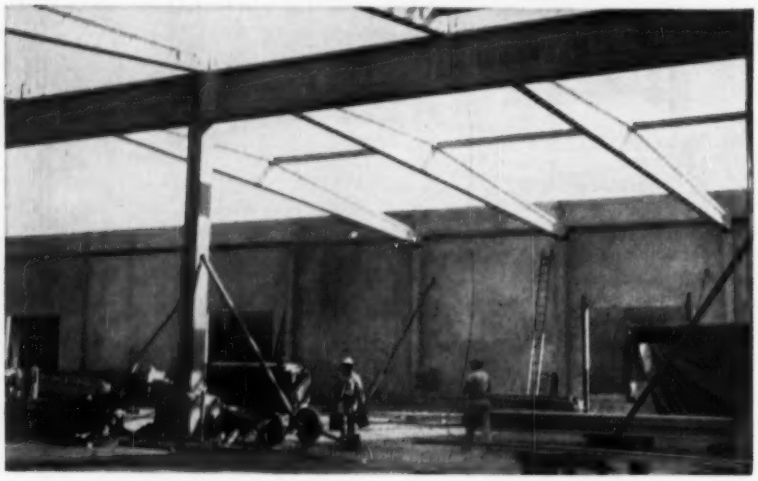
The Corps of Engineers has warned that river levees are in no better condition than then to meet water expected to rival or even exceed the crests of that year, and some are worse. Precautionary work is now being rushed at 21 key diking district river-bank works.

Water release at Grand Coulee level got under way after Brig. Gen. L. H. Foote, North Pacific Division Engineer, conferred with the Water Management Subcommittee of Columbia Basin Inter-Agency Committee April 19 in Penticton, B. C. The U. S. Bureau of Reclamation agreed to use the outlets in the face of the great dam to help lower the water.

Coulee level stood at el 1274 when the plan began. At the time the reservoir had 1,100,000 acre-ft of storage space available. If by use of the outlets, the lake level is dropped to 1250 ft, another 2,100,000 acre-ft of space will be provided.

The Weather Bureau has forecast a crest of 25.5 to 28.5 ft. This would result from flows of 720,000 to 870,000 cfs at The Dalles. Flow at Portland, a few miles downstream was 1,070,000 acre-ft in 1948. All-time record was 1,170,000 cfs in 1894.

The Corps of Engineers announced in Portland that river pressure on the main cofferdams at The Dalles project might compel the contractors to let the river in behind the cofferdams surrounding the powerhouse substructure. The Corps said this will not be harmful to the project, although some work in intake structures might be delayed until a dry-out later in the summer.



Quake Shifted Beams, Say Engineers

A damage survey of San Diego's Transit Shed No. 2 has resulted in a report blaming a mid-February series of earth tremors for shifting precast concrete roof girders out of position and crumbling the tops of columns.

The report disclosed that all the 40-ft prestressed concrete girders shifted at the girder-to-column joints—some as much as ¼-in.—and that enough concrete spalled away at the tops of some columns to expose the reinforcing steel. The 1½-yr-old building is still completely safe, however, the investigating engineers decided.

The 40-ft girders and columns affected divide the 133 x 880-ft building lengthwise down the middle. Beams, also prestressed concrete, span about 66 ft from girders to sidewalls. Columns are 20 ft high.

The survey was made by J. E. Liebmann, chief harbor engineer for the Port of San Diego; Thomas Atkinson, consulting engineer who designed the structure; and Robert Dorland, chief engineer for the Southwest Structural Concrete Corp., manufacturer of the girders. Liebmann said he believes the fill on which the warehouse is built amplified the tremors.

The San Diego Board of Harbor Commissioners has appropriated $10,000 for repair and precautionary strengthening of the shed. "The work to be done," Liebmann said, "is largely preventive and partially corrective." Spalled concrete will be chipped away, column tops will be strengthened with more circumferential steel, and sprayed-on concrete corbels will be added to the columns. Also, the girders will be re-tied across column joints to make the structure move as a unit in future quakes.

Longest Vertical Lift-Span For New York Harbor Bridge

A contract-signing ceremony between a contractor and the B&O Railroad in New York City late last week signalled start of work on a railroad bridge that will take over the title of the world's longest vertical-lift span.

The $11-million structure—a railroad bridge—will have a lift span of 558 ft across Arthur Kill, the waterway that separates New York's Borough of Richmond (Staten Island) from the New Jersey mainland. The lift span will thus be 14 ft longer than that of the long-time record-holder, the 544-ft Buzzard's Bay bridge over the Cape Cod Canal.

According to an announcement by the Corps of Engineers' New York District, the new bridge is being financed jointly by the U. S. Government and the Baltimore & Ohio Railroad, under provisions of the Bridge Alteration Act of 1940. Design and supervision of construction will be carried out under the railroad's engineering department, with Alec Mitchell acting as resident engineer. Plans and specifications were prepared by the New York consulting firm of Parsons, Brinckerhoff, Hall & Macdonald.

Long sought by shipping interests, the new bridge will be 60 ft north of an existing single-track swing span, providing a clear channel of 500 ft.

The contract—for substructure work—was awarded by the railroad to the Charles F. Vachris Construction Co. of Brooklyn, on its bid of $1.8 million.

DISCUSSION waxed hot when Italian designer and builder, Nervi (left) met Frank Lloyd Wright, as Prof. Mario Salvadori (center), Columbia University, translated.

Famous Designers Disagree

Sparks flew last week when Pier Luigi Nervi, noted Italian engineer, first met Frank Lloyd Wright, famed American architect. They clashed over concepts of city construction.

This is also Nervi's first visit to the U. S. On completing a brief tour of New York City, he attended a reception in his honor, where he was introduced to Wright. It didn't take long for a difference of opinion to develop.

Nervi confided that he was greatly impressed by New York skyscrapers and bridges. Best of all, he liked the Lever House—a 24-story glass tower interlaced with stainless steel trim—which was completed in 1952 (ENR May 1, 1952, p. 79). In general, however, he did not think too highly of New York architecture.

"When you try to do architecture, it is terrible," Nervi remarked. "But when you do engineering, it is beautiful."

"I disagree," Wright replied. "Even the bridges in New York are awful."

While Nervi thinks U. S. construction is heavier and clumsier than buildings in Italy, he didn't see eye to eye with Wright. The Italian engineer answered with:

"To bring engineering to New York would be like bringing coals to Newcastle."

Wright complained about space constriction in the city and was asked how buildings could be constructed other than vertically if space restrictions prevented horizontal construction. In reply, Wright made a spiralling motion with his hand, reminiscent of his design for the spiral-ramp Guggenheim Museum in New York City, on which work has not yet started (ENR Dec. 29, 1955, p. 24). Then, he departed.

Nervi is particularly noted for his work with thin-shell precast concrete. A partner in the firm of Nervi and Bartoli, Rome, he designed and built the Exhibition Palace in Turin, which has exhibition areas 310x260 ft and 165x210 ft with no interior columns. The larger area is spanned with curved precast concrete units only 1.6 in. thick, while the smaller hall is roofed with a ribbed vault of precast channel and pan-shaped units tied together with cast-in-place concrete (ENR Jan. 4, 1951, p. 46).

The concrete used is a development of Nervi's, which he calls Ferrocemento. It consists of closely packed layers of wire mesh and small reinforcing bars plastered with high-strength mortar. Nervi claims it has all the mechanical properties of a homogeneous elastic material.

Nervi is now on a lecture tour of the U. S. in which he is explaining his ideas. These will also be presented in a book, "Structures," to be published in July by F. W. Dodge.

Heliports Acoming

New York City approves one, five more are planned

On the heels of official approval of plans for a Port of New York Authority heliport at Manhattan's 30th St. and the Hudson River, the authority announced a proposal to construct five additional helicopter facilities in the metropolitan area.

Sanction for the 30th St. structure, a bulkhead-level strip that will extend 40 ft over the river, came as the culmination of a long debate between the PNYA and the city's Dept. of Marine and Aviation. The city department advocated an installation at the same location on a pier roof (ENR Sept. 22, 1955, p. 22).

According to Thomas M. Sullivan, PNYA's chief of aviation planning, the approved 30th St. installation will be handling more than a million passengers annually within the next ten years. The bulk of the passengers being handled initially are expected to be air travelers shuttling between the airports that serve the area.

The five other ports also would be built by PNYA and would be located:

- Near the Manhattan portal of the Queens Midtown Tunnel.
- Near both terminals of the Manhattan-Staten Island ferry.
- In the vicinity of the Brooklyn portal of the Brooklyn-Battery Tunnel.
- On the Passaic River near the business center of Newark, N. J.

The main installation would be the facility near the Queens Midtown Tunnel. PNYA officials are convinced that traffic will warrant construction in the near future if not even now. The four others would be considered secondary structures.

Flood Damage Higher Than Estimates, Towns Will Pay

Some Connecticut towns that had been counting on state aid to pay for reconstruction of local roads and bridges damaged in last year's floods have been told they will have to cover part of the costs themselves.

Gov. Abraham Ribicoff told the towns that under state law, only basic reconstruction of flood-damaged town roads and bridges can be financed from state funds. Any extras must be paid by the towns.

Ribicoff's announcement came on the heels of a revised flood report that estimated damage to town roads and bridges at $18.5 million, rather than the $14.5 million forecast earlier. A special session of the legislature voted only $14.5 million for this type of reconstruction.

Seattle voters OK complete treatment and . . .

A Ten-Year Fight Is Ended

After ten years of wrangling—and accomplishing nothing—Seattle has agreed on an approach to its sewage disposal problems and appears on the verge of concentrated action on a $25-million-plus long-range treatment works program.

Seattle's mayor, the City Council, various local pressure groups, an overwhelming majority of voters and the State Pollution Control Commission have acquiesced on a complete-treatment program as opposed to previously propounded primary treatment without sludge digestion and deposition of both effluent and sludge into Puget Sound.

Immediate plans call for $6 million worth of enlargements and modifications of four small existing plants to provide complete treatment, followed shortly by construction of intercepting sewers to a North Beach terminus. Here will be located a large complete treatment works to serve about one-half of the city.

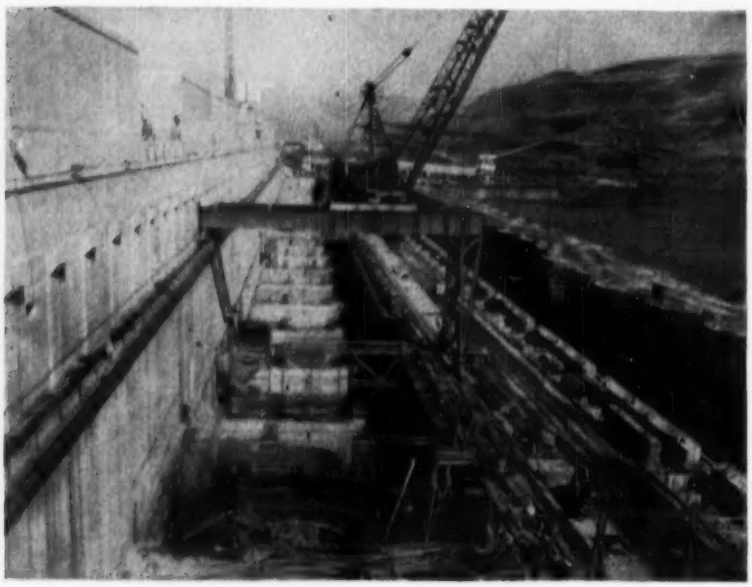
The lengthy imbroglio stemmed from a 1947 report by Abel Wolman of Johns Hopkins University which stated that Puget Sound could assimilate Seattle's sewage for many years to come with only primary treatment, provided that outfalls were extended a sufficient distance. Seattle's mayor and city engineer at that time agreed and proposed a comprehensive program which was accepted by the City Council. However, the State Pollution Control Commission objected, as did local sportsmen and owners of beach homes, and held out for complete treatment.

In 1952, a pro-complete treatment mayor was elected, but in the ensuing four years of his administration failed to convince the City Council to spend the extra money required. During these years, the state pollution agency backed down slightly by giving "qualified approval" to a primary treatment plant at Alki Point. The mayor reluctantly started construction but has managed to delay progress while battling the City Council for a complete treatment works.

During the mayoralty elections in March, the tide finally swung to complete treatment as voters overwhelmingly approved a $1.00 a month increase in water bill charges to finance the more expensive sewerage program. This appears to have knocked the last leg out from under the City Council's stand. The general voter attitude seems to be that while Puget Sound perhaps could take care of the city's sewage for a number of years, complete treatment plants would have to be built sometime, why not now.

While the main present concern is Puget Sound—which now receives sewage from 85 outfalls—Lake Washington, Seattle's eastern city limit, is becoming a problem.

Formation of a sewerage authority is being considered to finance an intercepting tunnel carrying sewage to Seattle's eventual West Side plants and thence into Puget Sound.



The Dalles Dam—It's Now 92% Complete

Concrete placement at The Dalles—multipurpose Columbia River Dam, powerhouse, navigation lock and fishways project of the Corps of Engineers—stood at 92% completion on April 1, as construction of the sprawling structure chalked up four years of progress.

The $303-million project may be the last wholly government-built major main stem development on the Columbia. Authorized John Day Dam involves legislative proposals for partnership construction 25 mi upstream from The Dalles.

Priest Rapids Dam, the other remaining major hydroelectric generation site on the main stem below Grand Coulee and Chief Joseph Dam, has the green light for partnership construction (ENR March 22, p. 21).

Powerhouse area is made ready for turbine as crane far in the background places concrete in fishways.

Skyway Span

American Bridge submits low superstructure bid

Bids were received last week for the third major construction contract on Chicago's Calumet Skyway toll bridge project.

The $6.8-million bid of the American Bridge Division of U.S. Steel Corp. was the lowest of four offered for constructing the superstructure of the high-level cantilever project over the Calumet River. The span, keystone of the $88-million Skyway, will connect the Indiana East-West Toll Road with State St. and Michigan and Indiana Aves. on Chicago's South Side.

American Bridge's bid was about 15% above the engineers' estimate and about 6% below the second low bidder. Allied Structural Steel Companies was second with a bid of $7.2 million. Bethlehem Steel Co. was third with a bid of $7.3 million. And the Mt. Vernon Bridge Co. was fourth with a bid of $7.7 million.

The contract calls for furnishing and erecting about 9,000 tons of structural steel. Of this, 5,000 tons will be in the cantilever spans and 4,000 tons in 1,200 feet of deck truss approach spans, towers and bents. The contract also includes the bituminous-surfaced reinforced concrete deck to carry the six lanes of toll traffic over the river.

The contract allots 575 calendar days for completion of the project and includes a $2,000-per-day penalty and bonus clause.

Panel suggests ways to meet . . .

Chicago's Growing Problems

Metropolitan Chicago faces a number of challenges in its continued industrial, economic and population growth—but none that can't be met successfully by adequate planning, hard work and a spirit of cooperation transcending political and geographical boundaries.

That was the consensus last week of a seven-man panel of planners, builders and civic leaders. And here's what they said must be done if Chicago is to keep pace with the changing times:

• **Regional planning**—Chicago's greatest challenge for the future is to develop a unified approach to metropolitan problems. The metropolitan area, including Chicago and the five surrounding counties, is growing according to a patchwork of unrelated local plans and a hodge-podge of project planning by special metropolitan agencies. And the practical result of the lack of coordinated planning and action are inadequate transportation, deficient water distribution, poor sanitation, new blighted areas and the engulfment of suburbs in waves of new growth.

• **Slum clearance**—The elimination of blighted areas and renewal of threatened middle-aged areas of Chicago are urgently needed. Despite the considerable mobilization of resources and new tools with which to wage the battle of urban renewal, Chicago will continue to develop new slums faster than present programs can clear old ones until a way is found to enable low-income families to occupy housing in accordance with other than slum standards. Slums will not be eliminated until, among other things, private industry can build a house which a low-income family can own or rent at a cost consistent with non-slum living; or unless low-income families are provided with a much greater volume of subsidized public housing than has been visualized to date in this country.

• **Downtown Chicago**—To anchor the downtown area, which is the very heart and pulse of the city, there should be developed an overall master plan, prepared and supervised by prominent architects, on a block-by-block basis for the rejuvenation and face-lifting of each property wherever necessary. In addition, speed up the proposed $400-million Fort Dearborn redevelopment project on the north bank of the Chicago River (ENR Mar. 25, 1954, p. 23); redevelop the south end of The Loop with a substantial high-rise-housing development to accommodate 40,000 to 50,000 people; remove The Loop elevated structures; and develop the west end of The Loop in order to give a new "front window" to encourage large-scale development on the city's West Side.

• **Mass transportation**—One of Chicago's greatest challenges is mass transportation, since the great bulk of new growth must necessarily take place in metropolitan areas which have little or no good transportation at present. Even when present plans for expressways and metropolitan toll roads are put into effect fully, many outlying communities will continue to be served by sub-standard transportation facilities. Additional expressway construction will be needed as well as modernization of many of the present streets, while greater effort will be required to put more public mass transit on its own right-of-way. In the city's central area, additional terminal parking will be needed; also better means of internal circulation of both automobiles and pedestrians. This all adds up to a bold, dynamic unified metropolitan transportation plan, coordinated with current programs.

The meeting was sponsored by the Chicago Tribune as the first in a series of discussions of vital issues bearing on Chicago's future. Moderated by the Chicago Association of Commerce and Industry's Thomas H. Coulter, the panel included city planners Frederick T. Aschman and James C. Downs, Jr., real estate developers Philip M. Klutznick and Arthur Rubloff, sociology professor Philip M. Hauser, and civic leader John W. Sheldon.

Chicago has good reason to look to the future of its housing, transportation and public works developments. Last year the Windy City had the greatest year of its economic growth. Over $1.5 billion of new investment went into the expansion of industry. It created a new economy within the metropolitan area that will support an additional population of 370,000 people.

Holland Tunnel Gets Catwalk Cars

After a year of experimental use, the Port of New York Authority has ordered four more "catwalk cars" (at a cost of $193,800) to help control traffic in the eastbound tube of the Holland Tunnel. The rail-carried, electrically-driven car is 2 ft wide, 11 ft long, 6 ft high and enables one patrolman to cover two or more posts formerly established for foot patrol. They also permit officers to reach trouble spots at speeds of 6 to 15 mph. If the Holland installation is successful, similar patrols will be installed in the westbound tube of this tunnel and in the three tubes of the Lincoln Tunnel. PNYA maintenance research engineers, working with the Special Devices Division of The Austin Co., developed the vehicle.

This advertisement appeared in full color in *The Saturday Evening Post*, April 28, 1956

Beautiful Delaware Memorial Bridge, built five years ago to connect the southern end of the New Jersey Turnpike with Delaware, is the world's sixth longest single span suspension bridge. Since opened, 34 million cars have crossed it.

Delaware's proud of its big bridge but...

The millions of cars it funnels through the state were giving Tom Gray fits as he tried to drive to work. Problem sound familiar? Here's what one state intends to do about it.

In New Castle, Del., Tom Gray's civic pride in his state's most ambitious project—the Delaware Memorial Bridge—wasn't all that it might be. He felt that, while driving to work in Wilmington, he personally encountered every one of the 8 million cars which use the bridge annually.

This sudden deluge of through traffic was bringing new problems to the state's already overburdened road system. Tom was painfully aware that Maryland, Pennsylvania and New Jersey aimed main highways at his state. He knew, too, that Delaware's population and car registration was the fastest growing east of the Mississippi. As a result, traffic on the roads he used to drive to work increased 13% each year since 1950!

Now the state of Delaware is acting. It proposes a progressive $325 million 15-year road building program. Of this amount, $112 million is scheduled for two-, four- and six-lane arterial highways across the state. These limited-access roads, designed to speed bridge traffic without tying up local roads, are expected to be built from present bridge tolls. And they'll enable Tom to drive to work in half the time.

The future of the proposed road building program in Delaware—and in your state—depends on voters making their support known. And if *you* want to know what you can do to put across *your* state's highway program, write today for free booklet, "Road Block." Just mail a card to Dept. 4, Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Wherever you see Caterpillar machines working on your roads, you can be sure your state is getting its money's worth.

Delaware Highway Week is being celebrated April 23 to 30 in conjunction with Springtime in Delaware. All state highway installations are opened for inspection.

SHAPING TOMORROW'S OPPORTUNITIES

Advertisements like the one reproduced on the opposite page are building business for you. They help the public understand the need for new and better roads. Caterpillar has been working at that job for more than seven years.

Motorists and taxpayers want good highways today, and are ready to pay for them. Getting them built is *your job*. And here again Caterpillar is able to help. When your bid gets the contract, the equipment you use can make the difference between profit and loss. Caterpillar research, constantly developing and improving engines and earthmoving machines, is giving you greater production, lower operating costs, surer profits.

Take the new Caterpillar wheeled rigs as an example. The CAT* DW21 Tractor (Series C) and the DW20 Tractor (Series E), with their matching LOW-BOWL Scrapers, are designed and built to *outperform any comparable equipment in the field*. And in repeated tests they have done it consistently, moving more yards, in faster cycle times, at lower cost.

These tractors have new TURBOCHARGED 300 HP (maximum output) Caterpillar Engines, and their big wide-section tires add to flotation and traction. The LOWBOWL construction of the scrapers is an important advance. It permits faster loading and bigger loads with less effort.

Caterpillar—and your Caterpillar Dealer—are your partners in shaping tomorrow's opportunities.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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LEADERSHIP IN ACTION

"Trojan H-2 Multi-Purpose Grease Lasts 25% Longer Than Any Used Before!"

Around Council Bluffs, when there's earth to be moved, Dofner's the man. Excavating for roads, house, or building construction, he keeps his 21 dump trucks and other equipment in constant operation to fulfill his heavy job schedule.

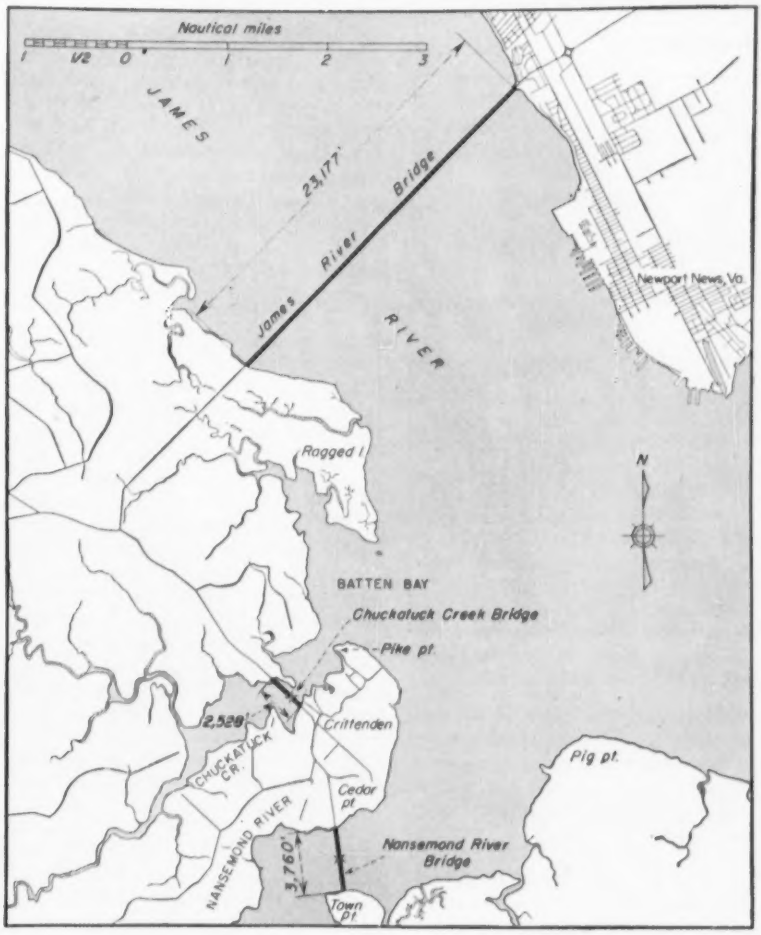
But you'd never know this by the amount of gasolene or lubrication required. "The fact is," says Dofner, "I've found Cities Service Trojan H-2 Multi-Purpose Grease lasts 25% longer than any other grease I've ever used. And my dump trucks are actually running an average of 10 hours apiece and getting as high as 20 loads on one tankful of Cities Service Gasolene. Needless to say, I'm sold on Cities Service!"

Again and again, Cities Service receives reports such as this from construction men. If you'd like to know the reasons why, talk with a Cities Service Lubrication Engineer. Or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

MORE OF DOFNER'S EQUIPMENT AT WORK. Although he keeps it in almost constant operation, Dofner reports he's never lost a bearing and goes 25% longer between greasings since he switched to Trojan H-2 Multi-Purpose Grease.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



On the James River Bridge System, near Newport News, Va., more than 2,500 concrete piles were repaired, more than 6,000 diaphragms were supported and pilecaps resurfaced

Salt, Tide Damage to Bridges Erased by Novel Facelifting

George Vaccaro
Project Engineer
Parsons, Brinckerhoff, Hall & Macdonald
New York, N. Y.

A realistic approach to bid-price establishment and use of watertight caissons designed for the job resulted in a successful $1.4-million rehabilitation of the James River Bridge System at Newport News, Va., recently. The system, composed of three reinforced concrete trestle bridges, one of them 4.39 mi long, was acquired, after 21 years of service, from private owners by the Virginia State Department of Highways in 1949. At the time of the acquisition, the department knew that it was headed for a big repair job.

The more urgent repairs were undertaken immediately, but it was not until 1952, with the engagement of the engineering firm of Parsons, Brinckerhoff, Hall & Macdonald, New York City, that full extent of substructure defects was brought to light. Most pronounced was damage to piles, sub-caps and caps of trestle bents by salt water, salt spray, frost action and water abrasion. Only about 30% of the 2,500 piles were considered sound—the rest showed excessive deterioration, especially in areas within the tidal range.

Inspection of the structures, the long James River Bridge and the shorter ones over Chuckatuck Creek and the Nansemond River, disclosed numerous cracks, spalled concrete and exposed reinforcing steel in most of the piles. Specimens of concrete removed from pile surfaces within the tidal range proved extremely porous and soft. Design strengths originally were 3,500 psi concrete in the piles, and 2,500 psi minimum for the caps.

The survey of 1952, when compared with 1947 inspection data, disclosed that 60% of the previously sound piles became damaged during the six-year period, so plans were made to include all piles in the rehabilitation project, regardless of relative soundness.

• Cost plus, firm bid combination—Because there are several acceptable methods of jacketing piles, contract plans and specifications delineated, in general, work to be performed, and described the minimum requirements for materials and workmanship. Accordingly, the bidders were required to submit with their proposal, working drawings and specifications of plant, equipment and methods proposed to accomplish the work. It was further specified that lump-sum bids would be received on the following items:

1. Mobilization and demobilization of equipment, including all plant equipment, tools and devices used for the concrete jacketing of the piles.

2. Rental of equipment and tools. Under this item bids were received on lump-sum monthly rental for plant equipment, tools and devices submitted and listed under Item 1.

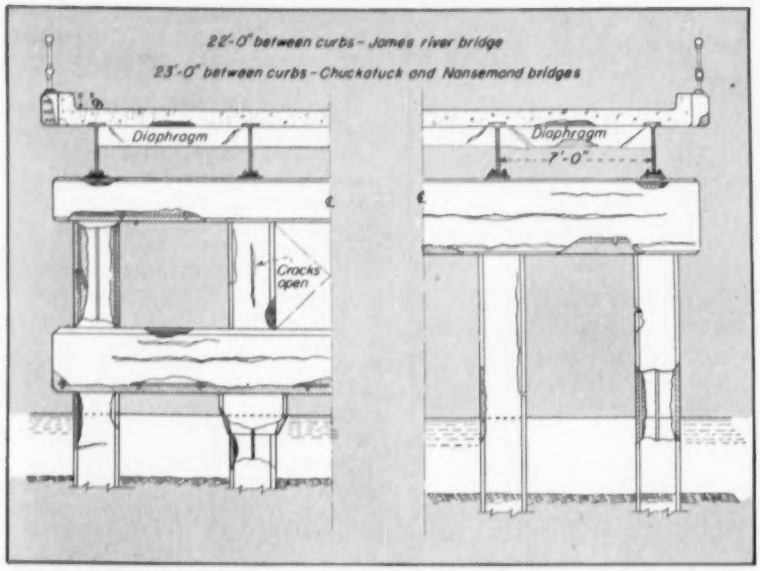
3. Service fee, which included full compensation for the professional services of the contractor, his executive officers and members of his firm.

4. Profit fee as a percentage of the cost of work excluding Items 1, 2 and 3, amounting to (a) $500,000, (b) $1,000,000 and (c) $1,500,000. Each of these amounts could vary by an increase or decrease up to $250,000 without change in the percentage of profit fee.

Cost of work included payment for all direct labor and material costs, insurance premiums and contract bonds not covered by Items 1, 2 and 3, and, when added to the four bid items, made up the total cost of the project.

Since the locations of defects varied

. . . Salt, tide damage to bridges erased



TYPICAL AREAS OF DAMAGE—not all necessarily found in one bent—were extensive in all structures. All piles were repaired, all diaphragms were supported.

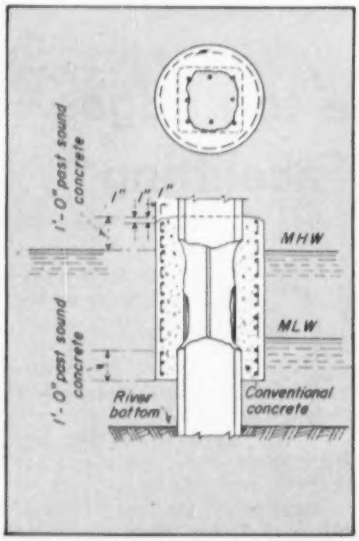
considerably, a large indeterminancy in quantities of material and specific site operations was expected. Rough water on the wide James River also added to estimating difficulties. Therefore, it was decided that the foregoing lump-sum bids would be made part of the bid requirements, but the majority of the rest of the work was bid in on a cost-plus-fixed-percent basis.

The plans of operations submitted by competing contractors, together with cost data on the four lump-sum items were closely scrutinized to ascertain which combination gave promise of getting the best job done in the least amount of time and at the lowest possible cost. Award went to Masonry Resurfacing and Construction Co., of Baltimore, Md., who elected to repair the piles in the dry within water-tight caissons.

The company's method of repairing the piles had been used with good results in the past (ENR, Nov. 1, 1951, p. 50) on a much smaller scale. This is the first time that so many of the larger-size concrete piles have been thus rejuvenated.

• **Method deserves another look**—MR&C had their caissons fabricated in two pieces, triangular in section and designed to fit pile sizes (18-in. and 24-in. sq concrete piles). Each piece was recessed at the bottom to receive one-half the pile, and ballast was added so the half-caisson would float in an upright position. When positioned against the pile, the caisson formed a 5-ft sq chamber seven ft in depth. Rubber gaskets were provided along the edges of the bottom recesses and the abutting edges of the sections. The sections were brought together around the pile—in the undamaged area below tidal range—and made watertight by a clamping device operated above water and with the aid of pressure of the outside water as inside water was pumped out.

After caissons were pumped out, the piles were thoroughly cleaned of all foreign matter and soft concrete. Where reinforcing steel was found to have lost more than 10% of its area because of rusting, new bars were lap-welded to the exposed unaffected metal. A platform was clamped to the sound part of the pile just above the caisson floor to support the form and concrete for the jacket, and to keep them separate from the caisson itself. A cage of wire mesh was next inserted and fastened to the concrete by means of previously placed anchors. Metal forms were then installed and concrete cast. The caissons were removed while the concrete was still in a wet state within the protection of the form and bottom platform. All 12-ga, galvanized steel forms were left in place. As many as 60 jackets per week were installed in quiet water, and costs ran $325-$340 per jacket.



PILE PROTECTION was cast in the dry within the tidal range, where damage was located. Steel forms were left on.

Reinforcement for piles was 8-ga, 4-in. x 4-in. galvanized wire mesh with concrete specified at 4,000 psi strength.

The job of repairing sub-caps of the trestle bents was more difficult. Deterioration occurred on the bottoms and corners of subcaps, and since surfaces were exposed for short periods only, high-early strength concrete was used. After all defective material was removed, 2-in. x 2-in., 10-ga galvanized wire mesh was anchored to exposed concrete surface, and 1 : 3 mix concrete was pneumatically applied in built-up layers not exceeding one inch in depth.

In addition to trestle work, there were 6,100 concrete diaphragms in the three structures, suspended from the deck at the end of—and giving lateral support to—steel stringers. These for the most part were in sound condition, but it was decided that by transmitting the load directly to the trestlebent, the possibility of future damage would be eliminated. This was done by welding steel haunches or pedestals to stringer webs, thus supporting the diaphragms. On the 20% that already were damaged, steel haunches were supplemented by installation of steel channels spanning the full length of the diaphragms. The channels were placed with their webs horizontal. It was thought that vertical placement and the resulting stiffening of the diaphragm would cause cracking where it joins deck slab ends, because there is no longitudinal top reinforcing steel to tie the slab to the diaphragm.

On the job for Parsons, Brinckerhoff, Hall & Macdonald were: partner in charge, Maurice N. Quade; chief specification engineer, John J. White; and resident engineer, J. H. Wilson, with the author as project engineer. Representing the state highway department were W. R. Glidden, assistant chief engineer; J. N. Clary, bridge engineer; D. B. Fugate, director of toll revenue facilities; and B. R. Belote, superintendent of bridges.

NEW! a cost-cutting drill for the push-button age!

the JOY JUNIOR CHALLENGER

BIG-DRILL FOOTAGE... LOWER LABOR COST... LESS TIME BETWEEN HOLES

Our customers asked for a brute of a drill on a mobile, "push-button" carriage. In other words, they wanted more hole at less labor cost, shorter time between holes, and faster set-ups. Here's our answer: the self-propelled *Joy Junior Challenger* . . . the FIRST COMPLETELY POWER-OPERATED WAGON DRILL ever produced. It drills anywhere, in any position, in any formation. The operator has nothing much to do but think, and change steels. Here are a few of the reasons why the Junior Challenger will cut costs on your job:

ALL POWER OPERATION—All movements of feed, drill, and carriage are hydraulic or air-powered—no chuck wrench necessary.

DRILLS AT ANY ANGLE—Vertical bench hole, toe holes, horizontal holes, and angle holes both up and down from the horizontal.

RIGID ALIGNMENT—Feed is supported by *two* trunnions, will not vibrate or move out of line.

STABILITY—Treads move independently up or down to conform with terrain, then are locked simply by turning a valve.

NEW HEAVY-DUTY 4½" DRIFTER—Has features found on no competitive machine; drills up to 3½" holes to 40 ft. depth *in any formation.*

SECTIONAL STEEL—1¾" round steel system, sectional type with detachable striking bar, has 9/16" o.d. air tube for outstanding hole-cleaning ability.

Write for complete information to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ont.*

SPECIFICATIONS

Easily drills up to 3½" holes to 40 ft. depth in any formation.

Drills horizontal holes to 7½ ft. height.

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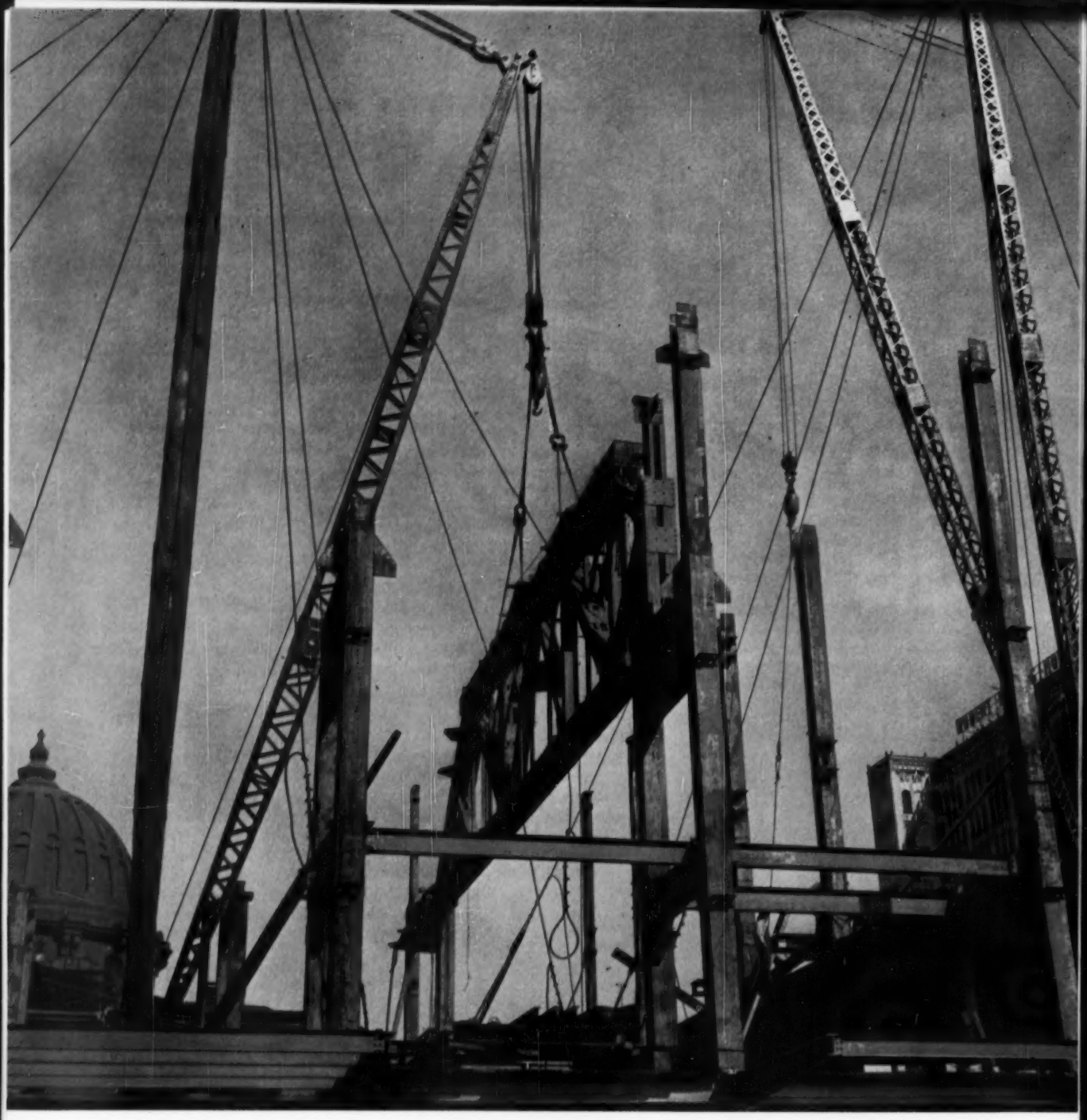
CONSTRUCTION EQUIPMENT MANUFACTURERS FOR OVER HALF A CENTURY



Architects for new Sheraton Hotel: Perry, Shaw, Hepburn and Dean, Boston; Structural Engineer: Maurice A. Reidy, Boston; General Contractor: McCloskey and Co., Philadelphia

Wire Rope at Work—Philadelphians are soon to have a great new hotel—the Sheraton. A 22-story building with de luxe features from lobby to roof, the Sheraton will be a unit of Penn Center, in the very heart of the city. It is to cost approximately $14,000,000.

Here is a picture taken as the steel skeleton was going up. It shows the erection of a 53-ton fabricated truss—one of five designed to support the ballroom ceiling and upper floors of the building. Muscle for the job was supplied by Bethlehem wire rope, Purple Strand grade, which has the strength and fatigue-resistance for even the heaviest lifts. As a matter of fact, it could hoist such trusses all day long and still be ready for more.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

CONSTRUCTION • EXCAVATING • MINING • QUARRYING • PETROLEUM • LOGGING • MANUFACTURING

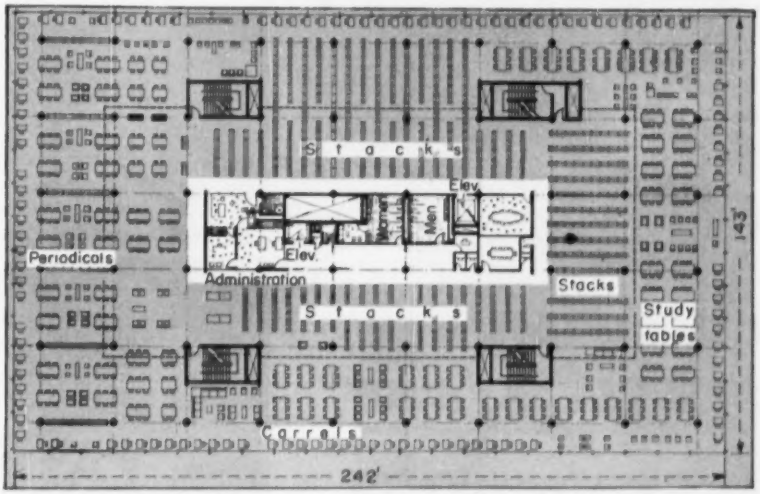
Library Will Bring New Look to Old Campus

With work on a $4-million, glass-walled library scheduled to start at St. Louis University this year, the campus of the oldest university west of the Mississippi will begin to acquire a new look. Part of a large-scale development program now in the design stage, the Pius XII Library is also expected to make the 138-year-old Jesuit institution a leading American research center.

Double-paned window units—heat and glare resistant outside, polished plate glass inside—will curtain the five-story structure from top to bottom except where ¼-in. colored and tempered glass spandrels girdle the building at floor and roof levels. Hermetically sealed ½-in. air spaces will separate inside and outside panes of the 4½x11-ft aluminum-framed units.

Comprising a basement and three main floors, plus near-full-size mezzanines above the second and third floors, the 242x143-ft reinforced concrete frame will rise 63 ft above grade.

GLASS EXTERIOR of proposed St. Louis University library is carried by cantilevered flat-slab floors and roof. Spandrels (dark bands) are colored glass.



SECOND-FLOOR PLAN typifies floor layouts. Study areas line the perimeter, bookstacks are farther inside. Central core encloses plumbing and other mechanicals.

• **Walls are column-free**—Nine-foot cantilevers will extend the flat-slab, drop-panel concrete floors and roof from the outermost columns to the glass walls. Concrete columns will be round, without capitals. Ceilings will be suspended acoustical type, providing concealed space below the slabs for air ducts and wiring. Recessed fluorescent troffers will comprise the centrally controlled basic lighting system, fed by low-voltage-control, 277-v power supply.

Closed circuit television, for central monitoring of the entire building, is anticipated as a future installation. Conduits for it are provided in the present plans.

Basement- and roof-located heating and cooling equipment will provide year-round temperature and humidity control through an all-air circulation system. Several features of the air-conditioning arrangement will be designed to overcome the difficulties inherent in large glass-wall construction and to furnish the necessary protection for the library contents.

High-pressure circulation of conditioned air at sill height will sweep the inside of the glass skin to a line above living-space level. A low-pressure system, using ceiling return and supply diffusers, will condition the interior zones. "Feeler" humidistats will be installed on window surfaces, as well as in room interiors, to maintain the delicate balance between optimum conditions inside and the low dew-point temperature of the glass walls. To insure exfiltration as a precaution against outside-to-inside air leakage, supply fan capacity will exceed by 25% that of the return fans. Supplemental dehumidification and temperature controls will protect critical areas, such as microfilm vaults and rare book storage rooms.

• **Study areas get daylight**—Interior layout on all floors is planned so that peripheral reading and study areas will surround the inner bookstack zones. Individual study tables will line almost the entire perimeter of all floors above the first.

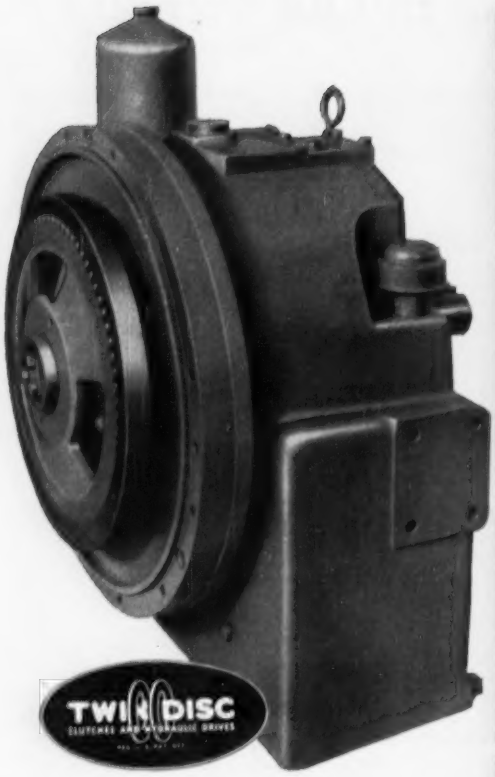
First-floor facilities will include book circulation and a public card catalog. Also located on this floor will be viewing apparatus and positives of the Knights of Columbus microfilms of Vatican Library manuscripts. Microfilm negatives will be stored in a basement vault. Other basement space will house a photo laboratory and mechanical equipment for the building.

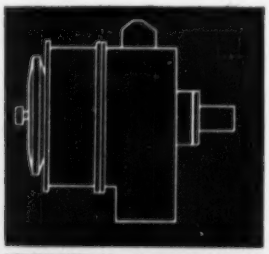
The core of the library building, enclosing elevators, lavatories and air ducts, will also contain, at various floor levels, a music room, seminar and conference rooms, typing cubicles, lounges, storage rooms, kitchen, and offices for library personnel.

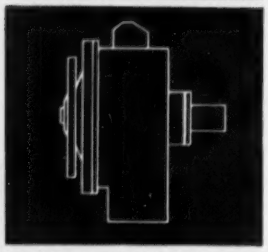
Cork tile will cover most of the floor area except for the slate-floored entrance and certain carpeted offices. Glazed partitions, plaster walls, wood paneling and ceramic tile will be used for interior finishing and space separation. Blinds will be 7½-in. vertical strips of fabric, on traverse rods. Operation will be either manual or powered.

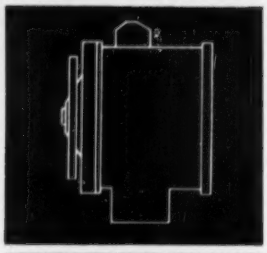
All construction will be fire resistive. One of the four enclosed stairways will be smokeproof. Security measures will include a central fire detection system and a watchmen's tour arrangement.

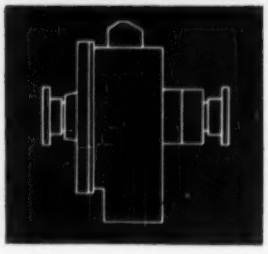
Architect-engineer for the project is Leo A. Daly Co., St. Louis.











announces new SINGLE-STAGE Torque Converters

Here's another good answer to the power transmission problems involved in today's construction equipment—the all new Twin Disc *Single-Stage* Torque Converter.

The new single-stage torque converter is currently available in the 1500 Series, which is applicable to engines producing from 30 hp at 1150 rpm to 198 hp at 2400 rpm. Four models provide various input and output combinations.

Already time-proved by extensive field tests, this single-stage torque converter is ideal for use in shovels, draglines, front-end loaders . . . in all types of construction equipment requiring smooth, efficient, dependable torque multiplication.

This new Twin Disc Torque Converter will cut operating costs . . . boost profits . . . handle the toughest jobs with ease. The converter's smooth flow of power eliminates sudden load shocks between engine and driven equipment . . . cushions out harmful vibrations.

Specify a Twin Disc Torque Converter, single-stage or three-stage, in your next piece of construction machinery or when you repower your present equipment.

TWIN DISC

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

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An ever-

to solve power

Torque Converters

One of the first major manufacturers to apply torque converters to construction equipment was Allis-Chalmers Manufacturing Company. This was back in 1940, when Allis-Chalmers introduced its Model HD-14-C Tractor equipped with a Twin Disc Torque Converter.

Soon after this new concept in power transmission was introduced, however, the requirements of World War II channeled virtually all heavy construction machinery into military use. It was during this period that torque converter-equipped tractors truly came into their own . . . to meet the difficult construction demands of the rapidly changing Pacific Theatre of Operations.

After World War II, the torque converter quickly proved its worth in civilian duty as it had in military service. Within a relatively short time, construction men everywhere were well aware of the increased efficiency . . . the increased production . . . the over-all savings that could be gained through torque converter drives in construction machinery.

The torque converter multiplies engine output torque exactly as needed (the Twin-Disc Three-Stage, up to six times at stall, if required)—consequently, harmful, costly engine lugging and stalling are eliminated. Shock loads and destructive vibrations are cushioned out—through fluid connection—and power is automatically matched to load demand.

News of these advantages quickly spread in the construction industry . . . and, within just a few years time, torque converters became a well-accepted feature in all types of construction equipment . . . in shovels, in tractors, in loaders, in off-highway equipment—wherever the many advantages of torque converters could be applied.

increasing trend to fluid drives

transmission problems on construction equipment

This torque converter-equipped crawler tractor receives a smooth, flexible flow of power — enabling it to do more work in less time. The converter in this particular tractor incorporates Twin Disc Three-Stage Torque Converter components.

Fluid Couplings

Along with the rapid acceptance and the increasing demand for torque converter drives in construction equipment, a wide choice in other fluid drives became available through use of the fluid coupling. This fluid drive provides the shock-cushioning and the overload protection of torque converters but is for applications *not* requiring torque multiplication.

Like Twin Disc Torque Converters, Twin Disc Fluid Couplings transmit power through fluid, absorbing shock loads and harmful vibrations. Their chief advantage is for those applications to construction equipment with hard-to-start characteristics and where the engine must operate at its most efficient speed and output. Efficiency of fluid couplings is high, with a maximum "slip" of only 4% at normal operating speed and power output.

Conveyors, crushing equipment, winches, vibrating screens, cranes — these are just a few of the many types of equipment used in the construction industry that profitably incorporate Twin Disc Fluid Couplings.

A favorite type of fluid drive with construction men is the Twin Disc Fluid Power Take-Off. For this reason, manufacturers like The Thew Shovel Co. have offered this fluid drive as standard for many models of their products for many years. The Twin Disc Fluid Power Take-Off mounts directly on the engine flywheel housing, making an efficient, economical, compact power package for shovels, draglines and other powered machinery.

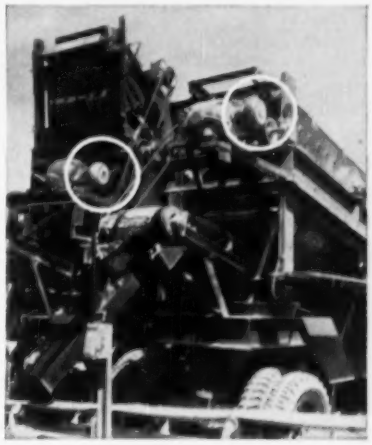
Another commonly used fluid coupling is the Twin Disc HYDRO-SHEAVE® Drive. This unit combines the advantages of a fluid coupling and a sheave for V-belt drive — in a single, unusually compact package. It is available for engines and motors producing from ¾ to 50 hp.

A Complete Line

First to introduce the torque converter to this country, Twin Disc has maintained its leadership in the industry through the ensuing years. Therefore it's not surprising that the latest announcement of interest to construction men also comes from Twin Disc. It is a new line of *single-stage* torque converters. Currently available are the 1500 Series models for engines producing from 30 to 198 hp. Development of additional sizes of single-stage torque converters is in progress and their availability will be announced shortly.

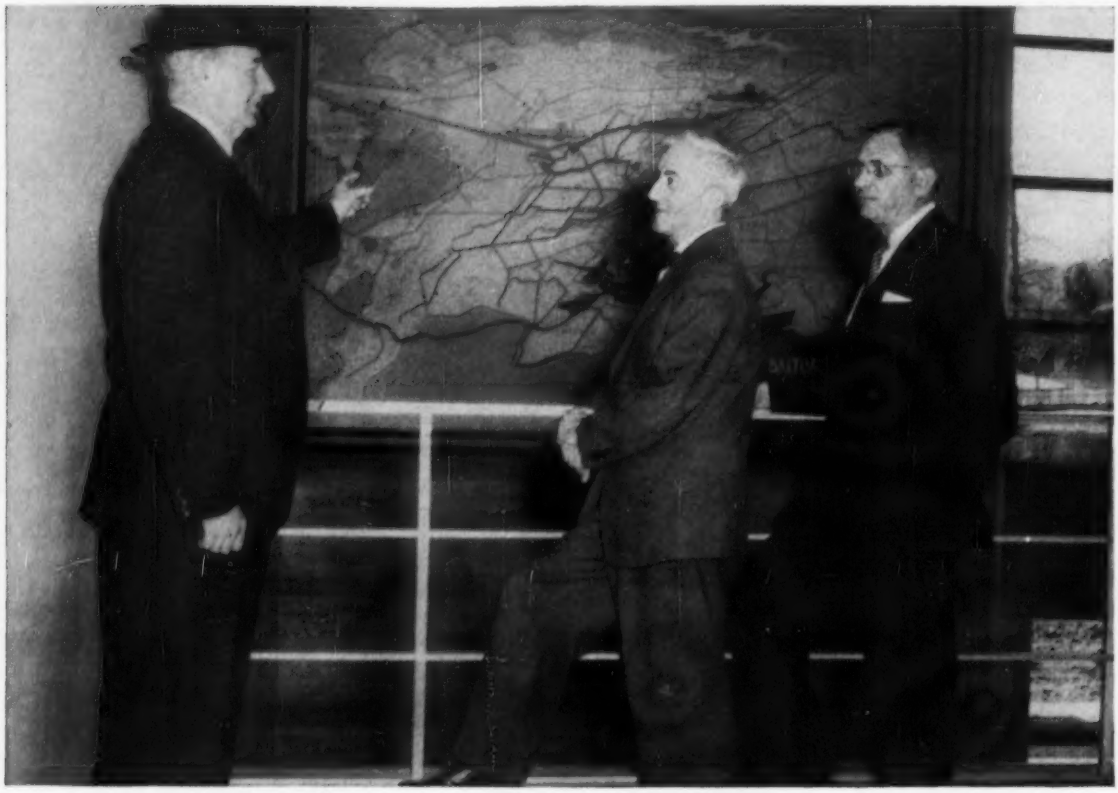
This power shovel is a typical application of Twin Disc Fluid Couplings on construction equipment. It benefits from the shock-cushioning characteristics of a Twin Disc Fluid Power Take-Off.

In addition to the most complete line of *fluid* drives available, Twin Disc also offers a complete line of friction clutches — and recommends these drives when they are best suited to a particular piece of equipment on a particular job. For example, Twin Disc Friction Clutches may be found on portable compressor units, mobile cranes, pumping units—in all heavy-duty construction applications where friction-type clutches prove most advantageous.



This vibrating screen works through another Twin Disc Fluid Coupling, the HYDRO-SHEAVE® drive. By picking up heavy starting loads smoothly and evenly, the HYDRO-SHEAVE protects both driving and driven equipment.

Yes, wherever you find construction equipment—from New York to Calcutta, from Seattle to Melbourne —you'll find Twin Disc Fluid *and* Friction Drives at work, solving the really *tough* problems involved in *proper* power transmission for construction equipment.



Designer Requardt, Planner Wolman and Manager Werner chart progress in . . .

1956: Baltimore's Big Year in Water

Howard Jacoby
Associate Editor

If yearly honors were awarded for progress in water development, the city of Baltimore would lead the contenders for 1956. For during this year Baltimore will:

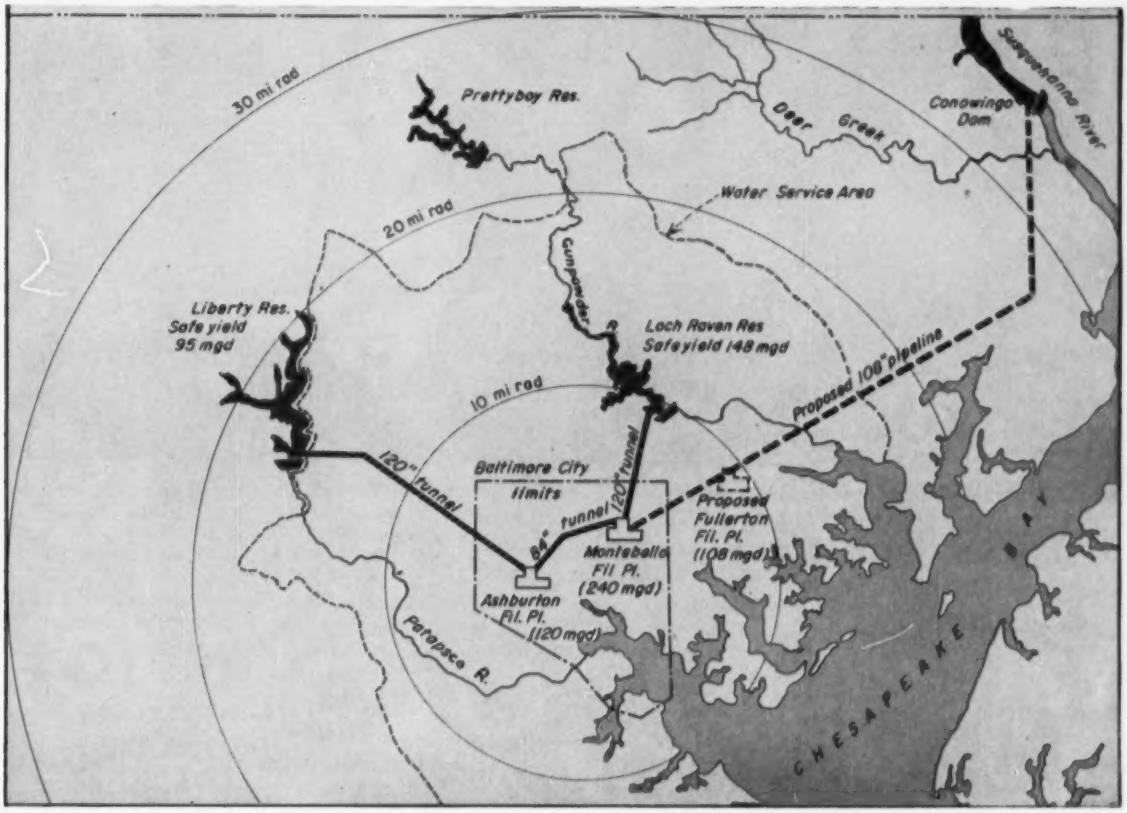
- Complete its second independent water source and treatment development at a cost of $49 million.
- Accomplish detailed planning for development of a third independent water source, purchase land therefor and request voter approval of a $45-million bond issue to finance construction.
- Begin a seven-year $20-million program to enlarge its distribution system, the first such concentrated attack since prior to 1900.
- Begin getting answers from its recently purchased fluid network analyzer, the first such machine to be owned by any water agency.
- Make a start toward setting up an independent water authority better to meet the evergrowing demand for water in the suburbs, in this case outside even county limits.

Yet, breathtaking as this progress is, the engineering accomplishments it embodies share equally in the spotlight. Ashburton filtration plant, the last portion of the second source development, which was placed in operation just last month, was built for under $100,000 per mgd of capacity, including 33,000 sq ft of air conditioned office space above the filter building. Its ideal location—almost exactly in the center of the distribution zone it will serve by gravity—was made possible by fitting a 120-mgd plant in a snug 12-acre site.

Concept of the third independent water source is as significant as it is startling. About $35 million will be spent on pumping facilities and a 38-mi pipeline, which will receive little, if any, use for about 15 years after completion. Availability of the water, however, will allow existing reservoirs, which are gravity sources, to be drawn down below their original safe-yield elevations. Third-source water will be pumped only during "firming" periods—for replenishment of gravity sources.

Normally prosaic distribution system planning became an exciting challenge when the city's consultant took on the monumental task of planning a system 45 years ahead, and one that consists of nine separate distribution zones, many of which are burgeoning suburban areas. A resulting 233-page report details the immediate seven-year program cited above, and a succeeding 12-year program through 1975. Flexible outlines are charted through the year 2000. The electrical-resistance network analyzer, which turns out Hardy Cross analyses in a matter of minutes, is depended upon to prove distribution system design.

Baltimoreans proudly proclaim theirs is the best water in the land. This claim has some sound basis in fact—for Baltimore is unique among large cities in that it obtains its water



THIS YEAR, dedication of Ashburton filters marked completion of Patapsco development, second independent source, while land acquisition and bond approval proceed for initial 233-mgd Susquehanna River tap, an unlimited source.

from relatively pure upland sources and then subjects it to a complete purification process. Local engineers may yield to New York City and Boston water at source, but to Baltimore, they claim, go the laurels for the finished product. And while Chicago, Philadelphia, St. Louis, Detroit and Los Angeles employ similar or even more complete treatment, their sources are relatively polluted.

Nature has been more than kind to Baltimore in providing upland water within 16 mi of the center of the city. Its engineers have returned the compliment by taking full advantage of these gravity sources. In a water sense at least, Baltimore has its cake and is eating it at the same time.

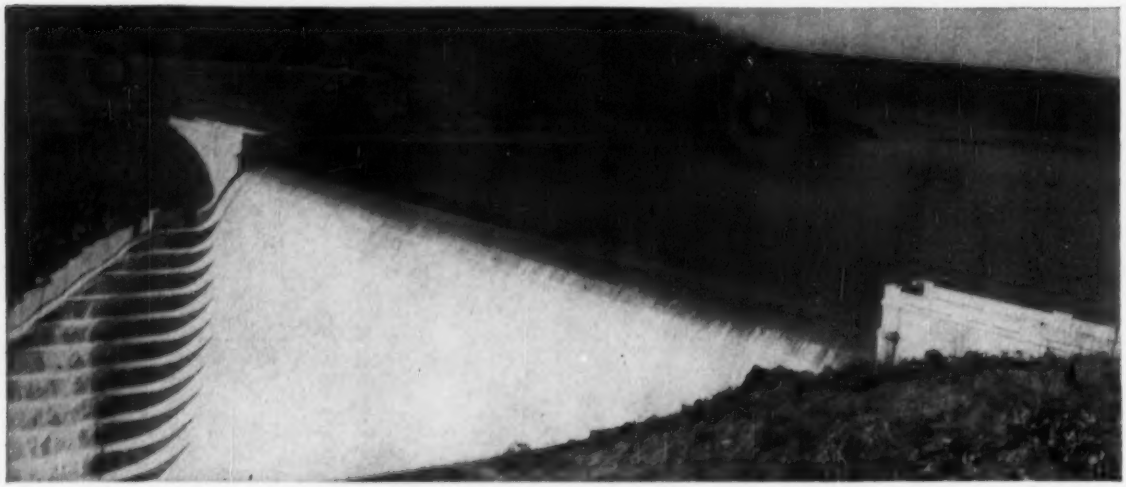
I. Patapsco River Development

Baking the cake though was not such a simple matter. In 1942, Baltimore's water supply consisted of Prettyboy and Loch Raven reservoirs on the Gunpowder River feeding by gravity into the two Montebello filtration plants. Water had to be pumped into all but the first distribution zone. Maximum safe yield of the Gunpowder source was 148 mgd whereas average daily consumption in 1941 was 137 mgd.

Water supply consultants Abel Wolman of Johns Hopkins University and Gustav Requardt of Whitman, Requardt & Associates—both of Baltimore—recommended in a 1942 report the immediate development of a second independent source to meet anticipated deficiencies that would occur in the 1940's.

In 1941, 1,000,000 persons were served and the daily consumption was 137 gallons per capita per day. Taking

HANDSOME ASHBURTON FILTRATION PLANT, 120-mgd capacity, was fitted in snug 12-acre site and contains 33,000 sq ft of office space above filters.



LIBERTY RESERVOIR on Patapsco River, completed in 1953, provides gravity flow into second distribution zone.

. . . Baltimore's big year in water

into account probable suburban growth after the war and per capita consumption rises after the first World War, Wolman and Requardt projected a 1960 population of 1,250,000, took a flyer on 175 gcd (consumption reached this figure in 1918). Based on these two figures, the consultants decided the new source should provide a safe yield of between 75 and 100 mgd which would take care of water needs into the 1960's.

• **Consider various sources**—There were several sources that could supply this demand. All which were seriously considered could be built for between $22 and $27 million (1942 prices) and would occasion annual costs varying between $12,000 and $16,000 per mgd of additional yield.

The most likely scheme was a dam on the Patapsco River and a tunnel to Montebello with provision for connection to second zone distribution reservoirs, to cost $23 million. A slightly different version included a filtration plant at Ashburton that could feed second zone by gravity and eliminated the tunnel between Ashburton and Montebello.

The Patapsco-Montebello plan was recommended because initial cost was lowest, excess filter capacity at Montebello would be utilized, and annual cost of operating the Montebello filters was less than savings in second zone distribution pumping costs if Ashburton were constructed. However, Ashburton was to be built either when maximum daily demand exceeded Montebello capacity or when mushrooming suburbs increased possible savings from elimination of second zone pumping.

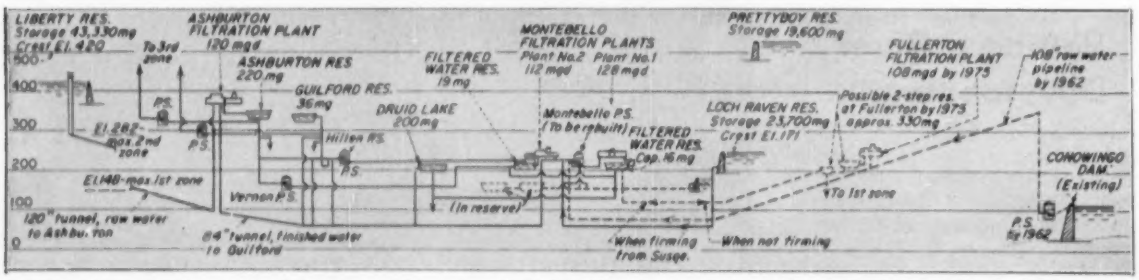
Also studied at this time was development of the Susquehanna River, which required a pumping station near existing Conowingo Dam (built by a power company) and transmission to either Loch Raven Reservoir or Montebello. The Susquehanna was recognized as the ultimate and inexhaustible source of Baltimore water. However, the consultants in 1942 felt justified in considering the Susquehanna on the basis of only 100 mgd additional yield because of the uncertainties of the war and post-war periods. On this basis, initial cost was estimated at $27 million and annual cost per mgd ran to $16,000, mainly because of high raw water pumping costs. In addition, the power company was then loath to allow diversions for water supply when other sources were available.

The Baltimore Bureau of Water Supply (then headed by Leon Small) and city officials accepted the recommendation and placed a $32-million bond issue up for voter approval in November 1942 (the excess money was to be used for distribution system improvements).

• **Lesson in public relations**—Voters turned down the issue after a heated campaign in opposition by two influential citizens groups composed of Baltimore's top businessmen. But the city learned a valuable lesson in public relations. For it had not given the businessmen, or the voters, information early enough or in sufficient detail.

The city hastily mended relations with the watchdog groups, but had to settle for a compromise incremental financing scheme. In 1943, a $12.5-million water loan was approved with the backing of top businessmen. Thereafter, every two years starting in 1946, bond issues varying in amounts between $5 million and $22.5 million have been approved by substantial voter margins.

Patapsco construction began in 1945 with letting of a tunnel shaft



PATAPSCO water flows directly into second zone, saving $1 million a year compared to twice-pumped Susquehanna water.

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. . . Baltimore's big year

contract. The tunnel itself was begun in 1947 and completed in 1951. Liberty Dam was started in 1951 and completed in 1953 (ENR Sep. 17, 1953 p. 35), and Patapsco water then flowed to Montebello.

Cost of the delay in bond issue approval and the final incremental plan is difficult to estimate. Final construction cost ran to $34.5 million versus the $23 million estimate. But even with 1942 approval of the bond issue some of the contracts would have had to be let during the sharp post-war rise in construction costs.

• Early Ashburton construction—In the post-war years, growth of the suburbs exceeded the advisory engineers' estimates and by 1952 it was apparent that early construction of Ashburton filtration plant would be advisable. Not only were second zone pumping costs rising because of the increased consumption in all upper zones, but the pumping stations themselves were rapidly becoming obsolete. That November, Baltimore voters approved a $17.5-million water loan that included Ashburton construction.

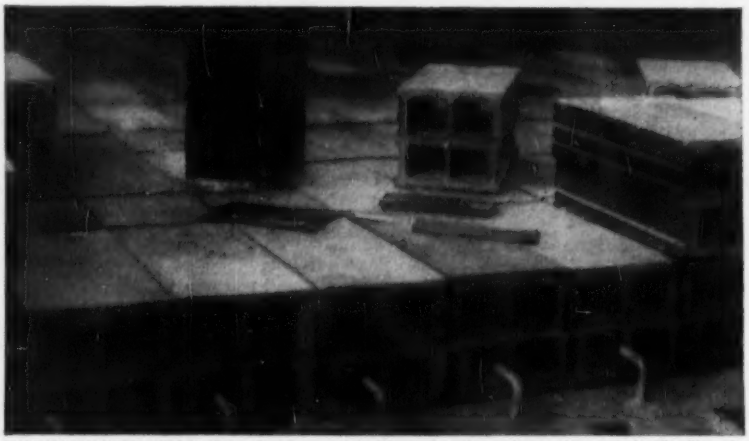
An ideal site for the plant had been acquired at the time tunnel right-of-way was purchased, and raw and finished water shafts were provided during tunnel construction. It is almost exactly in the middle of the second distribution zone, several hundred feet from one of the filtered water reservoirs serving that zone. Its only drawback was space—just 12 acres—but the plant designers, headed by Roy H. Ritter of Whitman, Requardt and Associates, overcame this obstacle by making every square foot of the plot count, as shown in an accompanying drawing.

The actual purification facilities at Ashburton, of 120-mgd capacity, are generally considered a very capable integration of the latest tried-and-true treatment methods: raw water control with positive reseating conical throttling valves, addition of alum with rotameters, chlorination, flocculation, sedimentation, rapid sand filtration in tile-bottomed units, and addition of lime. However, the engineers worked in, for less than 1% of the plant's $12 million cost, several striking features that reflect the concern of Baltimore's water people with public relations. But the most unusual feature of the plant is the 33,000 sq ft of air conditioned office space over the sand filters, obtained for less than $5 per sq ft.

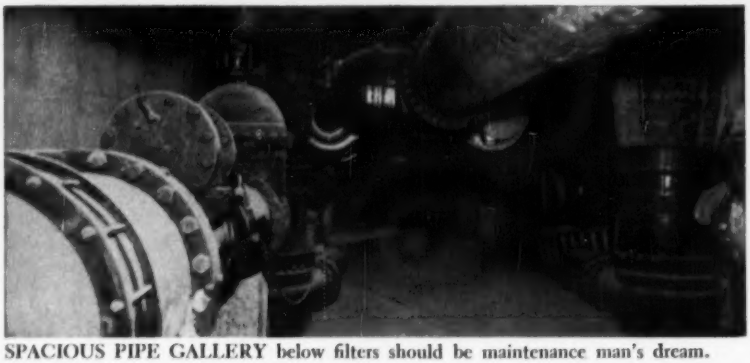
• An eye to the public—Ashburton's main entrance has been done up handsomely in Indiana limestone and plate glass with aluminum spandrels. Three 4x4½-ft cut stone panels—titled respectively, Source, Purification and Distribution—depict the essence of water engineering for visitors. Off to the right is a 50-ft-dia fountain equipped with underwater floodlights that produce ten different color effects on a 60-sec cycle.

On passing through this imposing entrance, the visitor sees a large mural titled, "Rain, the Source of Supply." Next to this is a second mural, a map of Baltimore in perspective showing the water distribution system in schematic.

Just as the plant's close-in location is a keystone of the public relations program, so did it make feasible the provision of the extra office space. In 1953 the Bureau of Water Supply was pinched for room. As a consequence, Bernard L. Werner, Water Engineer, requested the designers to incorporate "some" extra office space at Ashburton, the amount to be governed by available money. A U-shaped space over three sides of the filter building resulted. It is entered through



PERFORATED TILE filter bottoms at Ashburton take column bearing loads directly.



SPACIOUS PIPE GALLERY below filters should be maintenance man's dream.

Comparative Water Analyses

(typical finished water except as noted)

Test	Baltimore	St.Louis	New York	S. Francisco
Turbidity (ppm)	0.1	0.12	2.0	1.0
Color (ppm)	2	8	5	6
Dissolved solids (ppm)	80	256	41	65
Hardness (ppm)	51	98	19	44
Chlorides (ppm)	7.0	0.00	3.4	5.8
Bacteria per ml, Agar 37C (raw)	14	16,000	90	58
Bacteria per ml, Agar 37C	0	3	3	2
Coliform per 100 ml	0.00	0.00	0.05	*

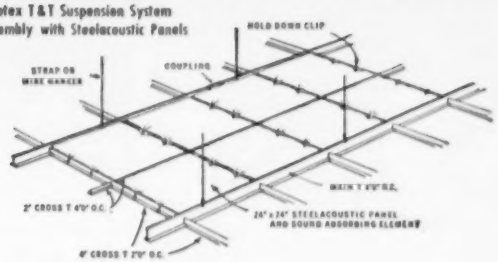
* Less than 1% of 10 ml tubes positive

BALTIMORE'S completely treated upland water shows up well in comparison with other not-so-fortunately situated cities.

Interior of Gladstone Shoe Store, Grand Rapids, Michigan, with installation of new Acousti-Celotex Stria-Colored Steelacoustic Panels.
General Contractor: C. D. Barnes Associates.
Acousti-Celotex Contractor: Leggette-Michaels Co.

Corridor of Schuylerville School, Schuylerville, N. Y., showing Acousti-Celotex Steelacoustic* Panels on a T & T* suspension system.
Architect: Waasdorp & Northrup, Rochester, N. Y.
General Contractor: Christensen & Neilsen.
Acousti-Celotex Contractor: Collum Acoustical Co., Inc.

Celotex T&T Suspension System Assembly with Steelacoustic Panels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COUPLING
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2' CROSS T 4'0" O.C.
24" x 24" STEELACOUSTIC PANEL AND SOUND ABSORBING ELEMENT
4' CROSS T 2'0" O.C.

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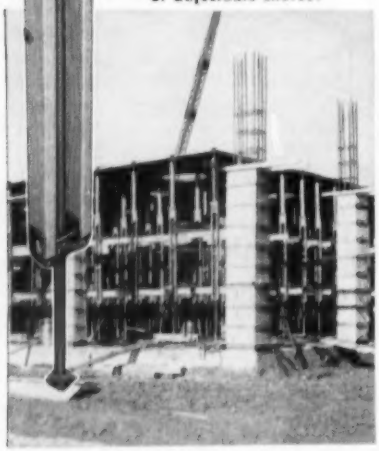

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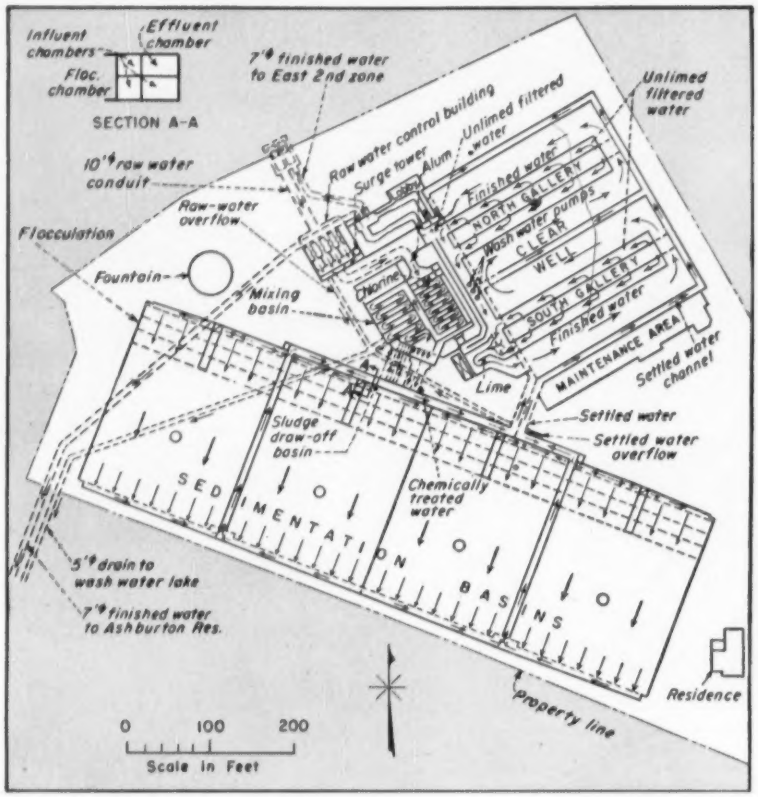

ASHBURTON FLOW DIAGRAM. Office space forms U around filters' perimeter, open side facing mixing chamber. Control room is located to left of wash water pumps.

the main lobby. Economies of this scheme are obvious: the land is free, foundations and filter roof need only slight beefing up, finished office space is obtained for the cost of the superstructure plus mechanical and electrical work.

• **Plant highlights**—Details on the treatment facilities are given in an accompanying table. Following are highlights of the plant.

Only two operators are on duty during the midnight and graveyard shifts—one man to handle the chemicals and the other the filters. Their work is eased by a convenient control room centrally located between the alum holding tank room and the filters. Ready access is provided to the above and to the lime feeders and chlorine room. Except for raw water throttling and filter backwashing, the entire plant can be controlled from this room, which of course contains the plant metering instrument receiver panels.

Areas of the plant to be visited by the public are finished off with glazed ceramic tile. These include the control room and filter galleries. Other spaces are of unfinished concrete. The quest for pleasing appearance in the latter area prompted the designers to incorporate heating coils in each filter control cabinet.

Pipe galleries beneath the filters were painstakingly designed to allow ample room and lighting for maintenance personnel. As an extra safety measure, the indicating portions of the chlorine cylinder scales are separated by glass panels from the weighing room itself. In the flocculating chambers, baffles are of corrugated asbestos cement rather than concrete.

Construction began in 1953, proceeded routinely and finished right on schedule for last month's introduction of the plant into service. A contract specification called for a minimum of 6 in. of compacted crushed stone under all concrete foundations, slabs and footings on rock as well as 12 in. of the same when concrete was placed on earth. The designers believed that the crushed stone layer over rock would achieve a more uniform settlement over the combination rock and clay base materials and also felt that the 6-in. stone layer would probably save in cost since the contractor is assured of not having to fill overexcavated rock with concrete.

Ashburton Filtration Plant Details

(120 mgd nominal capacity)

Raw Water

Throttling: 40-ft head when Liberty Res. full (El 420) by 4 30-in. cone valves, plugs lifted and seated hydraulically but rotated manually
Meter: one 5x10-ft concrete venturi tube
Low-lift pumps: none, provision for 4 @ 60 mgd

Chemical Treatment

Alum: 6 lead-lined liquid alum tanks, 18,000 gal ea, 2 constant-level feed tanks, 270 gal ea
Chlorine: 4 vacuum-operated chlorine gas feeders, 6,000 lb/day ea
Lime: 4 pebble lime storage tanks, 50 tons ea
Hydrofluosilicic Acid: 2 rubber-lined tanks, 6,000 gal ea
Bag Carbon: one tank, 10 tons
Mixing basin: 10 min detention, 20 180 deg turns, design WL El 368.8

Primary Treatment

Flocculation: 45 min detention, 4 50x180x15-ft basins each equipped with 21 flocculator mechanisms in 3 rows
Sedimentation: 3.6-hr detention, 4 180x180-ft basins, overflow rate 930 gal/sq ft/day, design WL El 366.5

Filtration

Filters: 20 40x53-ft rapid sand filters, 6 mgd cap ea at 2 gpm/sq ft, design WL El 366.0
Troughs: 6 2x2½-ft concrete troughs feed all way across 40-ft dimension
Sand: 24 in. of .5 to .6 mm sand, 10 in. of 14-mesh to ½-in. gravel
Bottoms: Compound duplex vitrified clay tiles 11x23x10 in. deep (Leopold)
Wash water: 2 tanks, 150,000 gal ea
Clear well: 20 min detention, design WL El 355.0

Storage

Ashburton Reservoir: 220 mg cap, 3.7 days detention at 60 mgd, design WL El 352.7
Guilford Reservoir: 36 mg cap
Both reservoirs serve 2nd zone by gravity, are sources for all higher zones

Water from Ashburton serves all upper zones with Montebello supplying the first zone. Hillen and Vernon pumping stations will be taken out of service. The former will be remodeled and readied for service for the time, expected by 1965, when Ashburton water can no longer meet the anticipated demand of the upper zones and Montebello water will have to be pumped.

In 1954, all zones above the first consumed an average 89 mgd (the first consumed 106 mgd). Cost of pumping the 89 mgd to the second zone by the Vernon and Hillen stations was $316,000, the major portion of this amount for electricity.

II. Susquehanna River Development

By 1953, it was evident Baltimore's population was growing so fast, studies for a third water source should commence at once. The 1942 advisory engineers, augmented by Harry B. Shaw, were engaged.

Their first step was to assess the area to be served. The City of Baltimore is required by statute to furnish water to the Baltimore County Metropolitan District; and in addition, by mutual agreement, provides water to the portions of Howard and Anne Arundel counties shown on an accompanying drawing. Reasoning that it would be far more economical for growing adjacent areas to obtain their water from the City of Baltimore, the consultants based their calculation on a 709-sq mi proposed service area shown in an accompanying drawing (Baltimore city contains 79 sq mi).

• **Population, consumption predictions**—It was determined to plan a development for the year 2000. Because of the lengthy prediction period, population growth was estimated using three different approaches—past growth rate, mathematical formulas, and a nuts-and-bolts study stemming from an analysis of vacant land. All indicated that population in 2000 would approximate 2,200,000, of which 1,300,000 would live in Baltimore.

(*Continued on page 48*)

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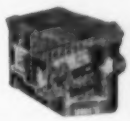

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. . . Baltimore's big year

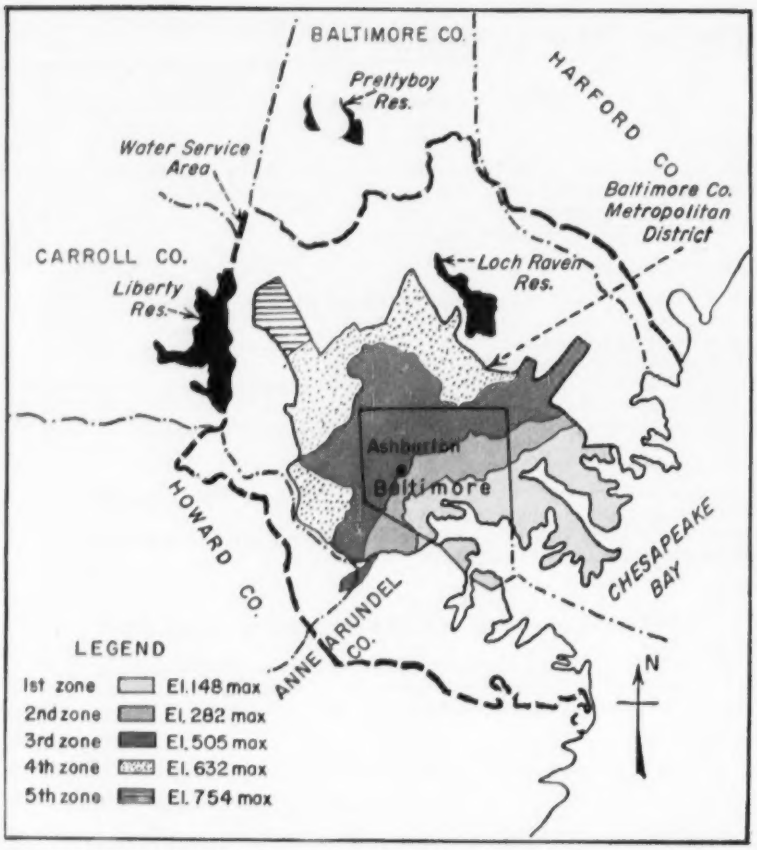
Raw water demand in 1940 was 134 gcd; in 1952, 163 gcd, for an increase of 2.5 gcd per year. The advisory engineers believed some of the increased usage reflected a pronounced improvement in living standards and so anticipated increases of a somewhat lesser magnitude. They adopted a decennial increment of 10 gcd.

Thus, total raw water demand predictions were evolved as below:

Year	Supplied Population	Per Capita Consump. (gcd)	Total Consump. (mgd)
1950	1,162,665	161	187
1960	1,380,000	170	235
1970	1,585,000	180	285
1980	1,790,000	190	340
1990	1,995,000	200	400
2000	2,200,000	210	460

Since total safe yield from the Gunpowder and Patapsco River sources is 243 mgd, an additional supply is necessary by about 1962, or at the latest, by 1965.

There are three available sources for the 220 mgd required—the Potomac, Patuxent and Susquehanna rivers. The board of engineers quickly discarded the first two because of their closer proximity to rapidly growing consumption areas around Washington, D. C., and the board's belief that these rivers should be reserved for development by the localities immediately adjacent.



WATER SERVICE AREA is 709 sq mi. Note Ashburton's central location to 2nd zone.

• **Turn to Susquehanna**—As far back as 1921, a detailed study was made of the Susquehanna River as a major water source. Again in 1934 and in 1942, the river was carefully analyzed. It always was concluded that when closer and cheaper sources were exhausted, Baltimore would turn to the Susquehanna for the final development step.

Susquehanna River water is of excellent quality and is available in unlimited quantity. Its single fault is that it must be pumped. However, the water consultants evolved a scheme of operation that minimizes the pumping disadvantage.

Baltimore's two existing water sources are gravity flows. Large quantities of water now overflow the dams because the reservoirs must be kept at high level in case of excessively dry weather. But if an auxiliary source, the Susquehanna, were always available, the upland reservoirs could be drawn down to lower levels and thereby utilize greater amounts of Patapsco and Gunpowder flow. The safe yield of 243 mgd from these sources could be increased considerably at virtually no risk since equivalent storage is available from the Susquehanna.

To obtain an indication of the amount safe yield may be expanded, an average 357 mgd of demand was assumed over one of the driest periods on record—from 1929 through 1950. With Susquehanna water assumed available, an additional 81 mgd could be obtained from Gunpowder and Patapsco, 68 and 13 mgd respectively, with but an average 33 mgd pumped from the Susquehanna. Pumping would have been required on only 1,703 days out of the 7,623 days in the test period. Of these, 943 days would have occurred during the 1929-1932 drought.

Thus, for the first 15 or so years after Susquehanna River development (assumed by 1965), it will be called upon very little, if indeed at all.

The pumps at the Susquehanna would receive water stored by Conowingo Dam which supplies an 89-ft head which is utilized by the Conowingo Power Co. Flows in the river exceed 6,400 cfs for 90% of the time and are greater than 2,000 cfs for 99.9%. Even at the year 2000, water diversions will interfere with power production at Conowingo only intermittently and to a very slight extent. Compensation payments do not loom large in relation to total unit costs.

Including a pumping station at Conowingo Dam and a 108-in. pipeline to Montebello plus 21% for engineering and contingencies, initial cost of Susquehanna development was estimated at $33.4 million. Estimated annual cost averaged through four decades is $55.60 per mg of yield over and above 243 mgd. This estimate was based on a conservative ultimate "firming" (replenishment of upland sources) of only 57 mgd.

The Bureau of Water Supply accepted the advisory engineers' recommendations and in 1955 commissioned Whitman, Requardt & Associates to prepare a preliminary design report and final plans and specifications (in anticipation of a favorable vote on this November's bond issue).

• **Hindsight look at 1942 decision**—It is interesting to re-examine the 1942 decision to develop the Patapsco source rather than go then to the ultimate Susquehanna source. Patapsco water still appears to be a good bargain, even considering the additional initial cost occasioned by the first bond issue failure, the sharp post-war rise in construction costs affecting the present Susquehanna project, and the development of the firming concept. Had the

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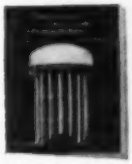

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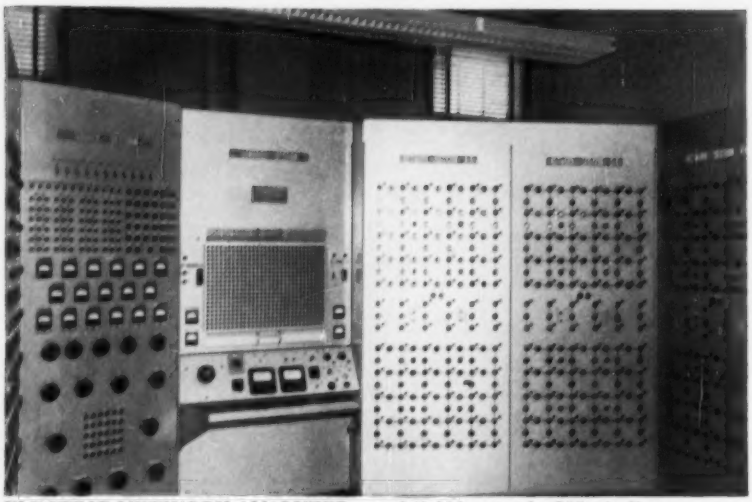


ELECTRIC NETWORK ANALYZER cost $40,000, can take 312 pipelines.

Susquehanna been developed for an ultimate yield of say 330 mgd in the 1940's in lieu of the Patapsco project, initial savings over the present two-project cost would have been about $30 million. However, the Patapsco gravity source feeding directly into the second distribution zone will mean annual savings of approximately $1.1 million over source pumping, compensation payments to Conowingo Power Co. and pumping to the second zone necessary with Susquehanna water.

• **Susquehanna conception**—Design of the pipeline from the Susquehanna to the Montebello filters is affected by location of future filtration facilities and their distributing reservoirs.

In his comprehensive report on the Baltimore water distribution system, John C. Geyer recommended that when additional filter capacity was needed—probably by 1975—a plant be built on the Susquehanna pipeline, either next to the river or as close as possible to the city. He also recommended a distribution reservoir and filtered water pumping station in the Fullerton area (which is as close as can be gotten to the city at this time). The reservoir would help iron out hourly variations in first zone consumption, would serve as a suction well for upper zone pumps, and would sustain the flow of Susquehanna water if the raw water pumps, the proposed filtration plant or the pipeline were shut down for any reason.

The designers, headed by A. Russell Vollmer of WR&A, have concurred with the Geyer recommendations (as have the advisory engineers) and now conceive the Susquehanna project as follows: In the first stage, a 108-in. pipeline will extend to Fullerton and a 90-in. line from there to Montebello. The second stage envisages construction of a 108-mgd filtration plant and distribution reservoir at Fullerton, and an 84-in. distribution main between Montebello and Fullerton reservoir. The transmission pipeline between Fullerton and Montebello would continue to carry raw water. This arrangement would allow full utilization of the Montebello filter overload capacity even when firming from the Susquehanna, thus reducing the required capacity of the Fullerton filtration plant.

A less advantageous arrangement studied was to use the transmission main between Fullerton and Montebello for filtered water after the former plant is built. This would mean, however, a 155-mgd plant at Fullerton and a 96-in. transmission main to Montebello, although it would allow reduction in the distribution lines between Montebello and Fullerton reservoirs.

Although many operating schemes for firming are possible, the following maximum daily flows in the year 2000 are being used for design purposes: When not firming, or depleting the upland sources, from Patapsco 180 mgd, from Gunpowder 360 mgd, and from Susquehanna 163 mgd, for a total of 703 mgd. In this case, filtration capacities at Ashburton and Montebello (at 50% overload) are being utilized to the maximum. When firming, flows will be from Patapsco 180 mgd, from Gunpowder 290 mgd and from Susquehanna 233 mgd, or 703 mgd total.

Since the difference in cost of 90-in. and 96-in. lines between Fullerton and Montebello is relatively small, that line will probably be 96 in. in dia to allow more freedom in designing the second stage of Susquehanna development. No final decision on first stage pipeline size has yet been made.

However, the city has approved location of the pipeline—it is to run through an area that is expected to develop and require Baltimore water. The route will parallel the proposed Baltimore Northeast expressway. The state highway department is presently negotiating for right-of-ways and Baltimore's Bureau of Water Supply will be close behind (even before voter approval of the bond issue). Land will also be acquired soon at Fullerton for the filtration plant and filtered water, reservoir to ensure its being available 20 years hence.

III. Distribution System

Many of Baltimore's large transmission mains and distribution works were built prior to 1900 and have served adequately through the first half of the 20th Century. But with lawn watering restrictions necessary in all years since 1952 because of inadequate pressures, and industrial expansion halted in many zones, another big hitch in distribution system construction must now be taken.

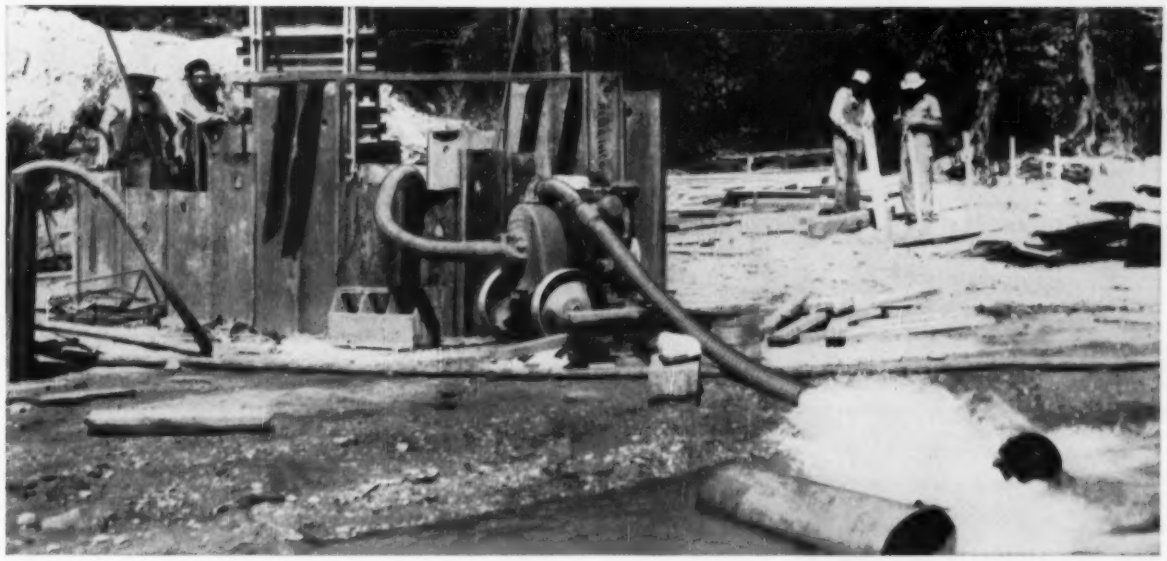
The city recognized this problem clearly and engaged John C. Geyer, in association with Jerome Wolff representing Baltimore County, to chart distribution system improvements through the year 2000. A 233-page report was completed in 1955.

After detailed studies and forecasts of zonal populations, consumption tendencies and the overall operation of the central system, the Geyer-Wolff report presents an improvement program for each of nine separate distribution zones (1st zone, two 2nd zones, two 3rd zones, three 4th zones and one 5th zone).

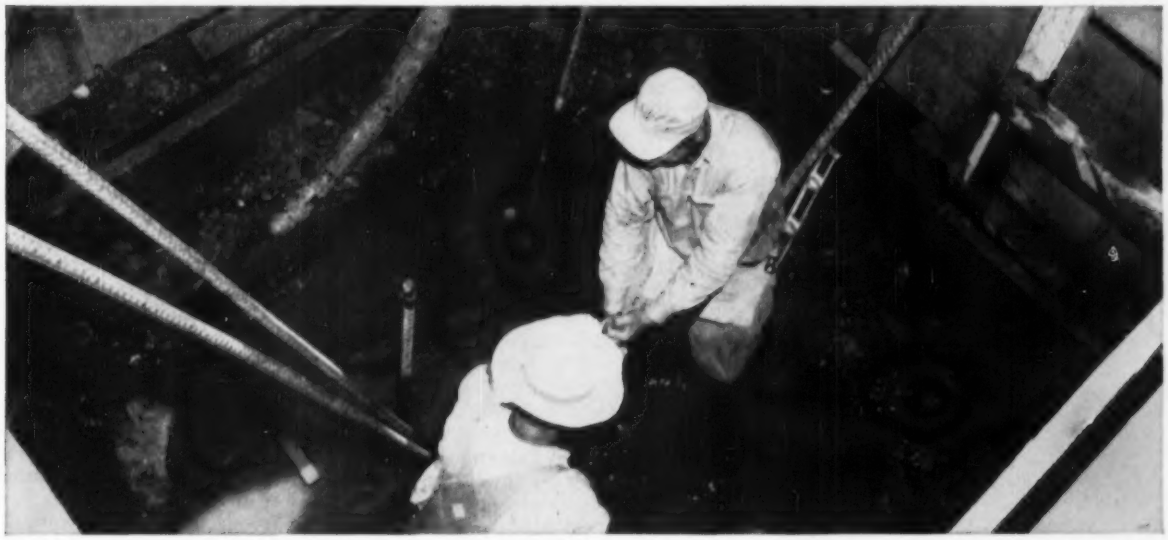
Construction programs for each zone are broken down into three periods each terminating at a so-called critical point: (a) 1962 when Susquehanna water will be available, (b) 1975 when Fullerton filtration plant and reservoir will be introduced, and (c) the design year 2000. Recommended improvements concern mostly feeder mains but include reservoirs, tanks, pumping stations and even service mains.

All told, $21 million worth of work has been recommended for accomplishment prior to 1962. The consultants considered it presumptuous to prepare estimates for the periods 1962-75 and 1975-2000.

(*Continued on page 52*)



PUMPING HEAVY INFLOW FROM PIER COFFERDAM was handled by this Jaeger 3″ Sure Prime pump, of 20,000 gph capacity.



INSIDE DEWATERED COFFERDAM, workmen place reinforcing steel for pier foundation. Job is one of 4 reinforced concrete bridges on State Route 26 between Arkadelphia and Antoine, Arkansas. W. C. Burrow, contractor.

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North Point Road Tunnel for 96 In. Water Line, at Sparrows Point, Md. Contractor: C. J. Langenfelder & Son.

DOTTED LINES show path of wet tunnel. Pre-drainage problem: Could a wellpoint system, placed at *street level*, remove 12 ft of groundwater with 25-ft suction lift? Before you say "impossible," see below.

DRIED PERFECTLY, by Griffin method, without interrupting heavy traffic to nearby Bethlehem Steel plant.

As photo shows, points did not cross highway but were placed along its sides and thus performed their unusual feat despite a huge gap in-between. What problem can advanced Griffin methods solve for *you?*

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. . . Baltimore's big year in water

In projecting over a 45-year period for a complex three-source system, the consultants faced many problems necessitating interesting assumptions.

Fundamental philosophy of the study is that it is better to build only a portion of an ultimate-size main (year 2000) than all of a smaller diameter line to serve an intermediate design year. When additional pressures are required, it is cheaper to add on to the larger pipeline.

When planning future pumping requirements, it was assumed that the pumps supplying any zone need operate only at the daily rate on the maximum day. Distribution storage must meet hourly fluctuations, fire fighting requirements and other emergencies.

Probably the most difficult portion of the report was the preparation of water consumption estimates for each zone for the years 1975 and 2000 and for average day, maximum day and maximum hour. By 2000, average daily consumption was predicted at 461 mgd, maximum daily consumption at 703 mgd, and maximum hourly consumption at 1,048 mgd.

• **Balancing distribution reservoirs**—Baltimore presently has 600 mg of filtered water storage among five open reservoirs, nine tanks and the filtered water basins in two filter plants. Keeping such a complex system of distribution reservoirs balanced as consumption increases and more are added is a most difficult and delicate task. It is best approached by periodically changing hydraulic characteristics of the pipe network by adding new lines.

Gever sought the following type of performance when designing pipe networks serving multiple reservoirs to make all of them oscillate simultaneously near full levels: Oscillations should be imposed on the largest reservoir for some period following an important addition to the network, during which period the smaller reservoirs, that ordinarily ought to have a lower overflow elevation, would stand full most of the time. As consumption increased, the smaller reservoirs would finally begin to function under ordinary daily fluctuations in demand. As time went on, water levels in these smaller reservoirs would oscillate between progressively lower levels. Finally a point would be reached where it would become desirable to strengthen the system in the direction of the smaller reservoirs and again allow them to stand full.

• **Distribution storage criteria**—Selection of the proper amount of distribution storage is even more difficult than balancing hydraulic performance of reservoirs. Arbitrary criteria were selected to produce two storage requirements for each zone, minimum and ordinarily desirable.

For minimum storage desirable:

• In upper zones where ground storage is not practical, provide tank storage equal to 20% of maximum daily consumption to meet daily fluctuations.

• In zones having ground storage, provide water to meet fluctuations (estimated at 15% of maximum daily consumption for the second zones and 12.5% for the first zone) plus a reserve equal to one-half of the average daily demand. If the reservoir also serves as source for a higher zone which has no reserve, provide additional water for fire fighting plus one-half of the daily rate for the higher zone.

For storage ordinarily desirable:

• In upper zones with no ground storage, provide storage for 20% of maximum day plus a reserve for fire fighting, or an amount equal to one-fourth the maximum day, whichever is least.

• In ground storage zones, provide water for hourly fluctuations, fire fighting and for one day's emergency reserve at the maximum daily rate. If the reservoir is source for a higher zone having only tank storage, provide also one day's reserve at maximum day for that zone.

Within the limits arrived at by these criteria, each zone was then studied individually in terms of such factors as (a) proximity and reliability of its source, (b) duality of supply, (c) reserve pump capacity, and (d) possibilities for emergency interchange of water between zones.

Throughout the report the consultants stressed the importance of Baltimore's purchasing an electric network analyzer. Only 14 Hardy Cross analyses were made for the report at hand. It is felt that several hundred such analyses are necessary to provide economic comparisons and to reassess and revise the report's recommendations from time to time. So far as is known, the hydraulic behavior of mutliple reservoirs on municipal distribution systems has never been analyzed because of the enormous amount of work involved. A network analyzer speeds solution of this problem.

To implement this report, the city has definitely scheduled $7.4 million worth of work for the period 1956-59. It hopes to finance the remaining $13 million that was recommended for 1962 completion from this November's bond issue money.

(*Continued on page 54*)

Contractor Takes Tractair to Church and Solves Unusual Construction Problem

Remodeling of this large church depended on plenty of air power.

"Inside" job was confined, crowded, with poor footing.

Here's how a construction firm found the answer with a Le Roi Tractair.

A self-propelled Le Roi Tractair compressor went to church recently to help the Caspian Construction Company of Caspian, Michigan with an unusual air-power problem.

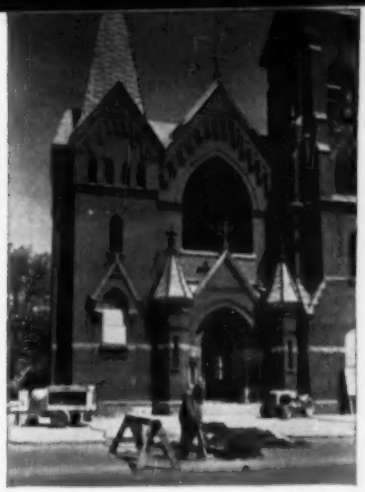
The job was different and difficult. St. Mary's Church in Wausau, Wisconsin was to be remodeled inside, from the ground up. Plenty of air power was needed to work essential tools. But long hose wouldn't work because of friction loss and danger of abrasion from debris. Not even small trucks could get inside the building.

To solve the problem, a Le Roi 125 Tractair, capable of working in crowded conditions . . . maneuvering in tight corners . . . "stepping" through loose, deep sand, was driven into the church. In this way continuous air power was provided for the job, without tying up additional equipment or men.

The contractor states, "The Tractair was a life-saver on this job, due to the fact that it is so mobile. It did a very fine job for us and served all of our needs at a very low cost of operation."

Ready to work at any job. Tractair, a combination 42-hp wheel tractor and 125-cfm air compressor, can be equipped with a variety of drilling attachments, front-end loader, backhoe, rotary sweeper, backfill blade, and operates Le-Roi-Cleveland air tools — rock drills, pavement breakers, clay spades, backfill tampers.

On this job, the Tractair functioned as a specialized tool providing a complete answer to the need for dependable air power inside the church. The Le Roi Tractair was also used outside the church to break concrete, along with a portable Le Roi Airmaster compressor. On many jobs, the Tractair can replace a truck-towed compressor with a 50% saving in equipment costs and manpower — and unlimited savings in time.



(Above) Work outside St. Mary's church in Wausau, Wis., used Le Roi Tractair and Le Roi Airmaster compressor to break concrete.

(Below) Inside church, Le Roi Tractair provided air power when and where needed because it can move about in confined, crowded places.

Le Roi Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin also manufactures portable and stationary air compressors, air tools, and engines. Write today for information about any of these products.

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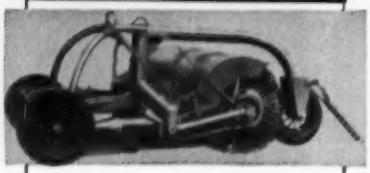

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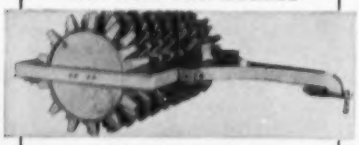
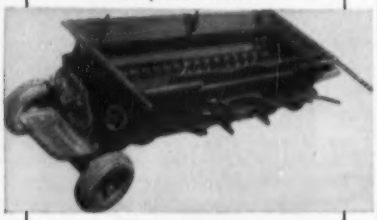
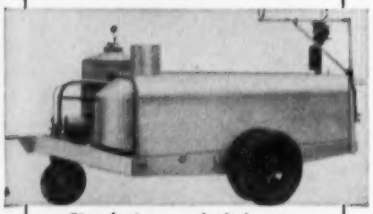


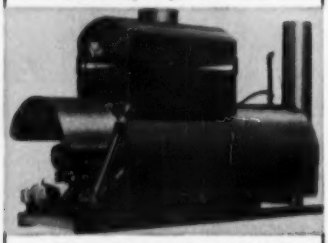
Sheepsfoot rollers



Chip spreaders



Circulating asphalt heaters



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. . . Baltimore's big year in water

IV. Bureau of Water Supply

The nerve center of Baltimore's accomplishments in the water field is the office of Water Engineer Bernard L. Werner, who heads up the Bureau of Water Supply in the Department of Public Works. It is he who pulls together the efforts of the various consulting engineers. But the bureau itself is also moving fast in 1956.

Foremost on the agenda is this November's referendum on the $45-million bond issue to finance Susquehanna River source development in its entirety. It is significant that Baltimore now returns to the entire-project type of finance that was defeated in 1942. Werner is quite confident that the voters will say yes in November—so much so that final plans and specifications will be near completion prior to the referendum.

• **Push public relations**—Unlike 1942, this year is seeing great effort expended to increase public understanding and appreciation of the water system. Ashburton filtration plant—in its convenient close-in location—is the main feature of this extensive public relations campaign. Continuous open house replete with handsome displays is held there. Special emphasis is given school children, envisaging a whole generation of voters better educated on water problems. The bureau also has in the works a simplified brochure, which will be widely distributed, explaining the workings of the city water system.

While the bond issue is getting the headlines, the bureau is quietly at work on a plan to establish an independent water authority having jurisdiction over the entire water service area. At present, Baltimore County Metropolitan District must, by state law, be supplied at cost (because sources are located in county areas). The District also finances and constructs its own distribution system improvements, then turns them over to the city for operation and repair.

These two conditions cause many complications such as (a) computing "actual cost" when amortization of both source and distribution systems must be taken into account, (b) frequent claims by both city and county that one's distribution system improvements also help water pressures in the other's system, and (c) higher rates charged consumers located on city-owned distribution lines than on county-owned mains.

The thinking of Werner and Baltimore consulting engineers is that an independent authority would acquire the capital assets—and debts—of the water systems in the entire water service area, and would have the power to condemn land, float bonds and set rates. The authority would be in a better positoin to establish orderly financial arrangements and system expansion.

• **Purchase network analyzer**—Acting on the Geyer-Wolff report, the Bureau of Water Supply became, in November 1955, the first water agency to own an electric network analyzer. The unit is the McIlroy Fluid Network Analyzer whose operating principles have been well publicized (ENR Aug. 30, 1951 p. 35).

Baltimore purchased a medium-sized version for $40,000 from the Standard Electric Time Co., Springfield, Mass., sole manufacturer. Based on analogies between hydraulic and electrical characteristics, the city's machine enables duplication of 312 pipelines, 11 sources and 73 loads. There are six adjacent panels, each about 3x8 ft. Two panels are used to represent sources and loads. The three panels to the right of the control desk simulate the pipeline network.

Uses of the analyzer are legion. As Werner puts it, just the reduction of one pipeline size pay for the machine.

Baltimore's analyzer is sized so that one complete zone can be put in. Comparing machine operation time to manual Hardy Cross analysis, the same preliminary work of obtaining pipeline sizes, lengths and roughness coefficients must be done for both. For use in the analyzer, these data are then converted into equivalent size non-linear electrical resistances, known as Fluistors, which takes just several minutes for each pipeline. Setting a zone into the machine once the electrical equivalents are calculated.

Actual Hardy Cross solutions then take only seconds. Individual lines or loads can be changed in minutes.

It is probable that when Baltimore completes the first rush of work in the analyzer, there will be some machine time available to other users. Or to put it another way, once preliminary calculations are made, the machine can be set up in a very short time. This opens up the question of who else will be allowed to use the machine. The Bureau of Water Supply and higher city officials have reached a tentative decision that only public agencies will be accommodated.

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SWINGING 18-YARD CABLE-DUMPED, TANDEM-AXLE SEMI-TRAILERS, these rugged GMC Diesels haul away 21 tons of clay at a clip—right to the limit of the Michigan weight laws. This 70,000 GCW model is one of a complete line of GMC Blue Chip heavy duties meeting every hauling need in the 59,000 GVW-90,000 GCW range. Especially designed for tough construction jobs, these new GMC's are *extra-stamina-engineered* —are equipped with new oversized axles. When required for exceptionally severe service, full-length channel frame reinforcements are obtainable as a factory-installed option.

"Our 10 GMC Diesels hauled 1 million yards in 2½ years—with engine maintenance of only $40 a truck!"

Sugden & Sivier have worked some of Detroit's biggest construction projects. One of the toughest was hauling away 400,000 yards of soggy blue clay on the John C. Lodge Expressway job. To keep things moving, every load had to be heaped right up to Michigan's 70,000 GCW limit. And five of the ten miles to the dump point were through fuel-eating city traffic.

Clearly, Sugden & Sivier had to have trucks that could take a lot of punishment—keep rolling—keep costs down. Past experience gave the nod to GMC Diesels. So their bid was based on the expected performance of 10 new tandem tractors they stood ready to order.

"We knew GMC's could handle the oversize loads," says Grant L. Sivier. "We've never seen anything like them for sheer brute-strength. Yet there's not an ounce of 'fat' in their design to waste our allowable road-weight. And it was GMC Diesels' economy that let us bid as low as we did."

Actually, the 10 new GMC's did even better than expected. Over the entire first year of use, engine repair costs averaged just $11 per truck. And fuel mileage—despite the 42,000-lb. loads and stop-and-go traffic work—was a smart 4.7 m.p.g.

Today—2½ years later—Sugden & Sivier's GMC Diesels *still* deliver 4.7 m.p.g. They've each hauled 97,500 yards of payload—clocked about 100,000 miles apiece. Yet total engine maintenance costs of all 10 trucks still come to less than $400.

Want economies like these on your jobs? There's a cost-cutting GMC Blue Chip tandem—gasoline or Diesel—engineered for any truck-work up to 59,000 GVW-90,000 GCW. Check your requirements *now*—with your GMC dealer!

GMC TRUCK & COACH—*A General Motors Division*

TOP TONNAGE AND TIGHT SCHEDULES ARE NO PROBLEM to this fast-stepping GMC Diesel. Its power comes from a new cost-cutting *2-cycle* Diesel engine—one of a great new line of Blue Chip power plants engineered to take the toughest truck-work in stride. They include a wide choice of gasoline and Diesel models.

AT WORK ON AMERICA'S TOUGHEST JOBS, Blue Chip GMC's are chalking up standout performance records—and earning record profits—for many a leading contractor. Extra-powered engines—extra-capacity axles—and extra-tough construction throughout—make these GMC's the top choice for punishing jobs.

Set your sights on an Allis-Chalmers HD-6G

"ALLIS-CHALMERS HAS A GREAT TRACTOR HERE... we like our HD-6G for its low cost, big output, easy transport and simple operation"

Joe Brown, Ratliff City, Oklahoma

Working on all kinds of jobs, large and small . . . keeping 9 trucks and 5 Allis-Chalmers tractor shovels busy, that's the Joe Brown Company. Read what owner Joe Brown says about his new Allis-Chalmers 1½-yd HD-6G:

"Working with two trucks on a recent road job, our 6G moved 700 yards of big rock in one day. In dirt it does even better. The tracks are heavy and long, and power is well coordinated with the bucket. All this means real economy to us; we're profiting with the 6G."

Kenneth Chromieter, HD-6G operator, says: "I like the visibility; and the engine is terrific." And speaking of bucket capacity and strength, Chromieter added, "You know, we had rocks in this bucket they wouldn't let me dump on the trucks. It sure can do the job."

• • •

Yes, the HD-6G "sure can do the job." Stories like this from owners and operators are coming in from all over the country to prove it.

Let your Allis-Chalmers construction machinery dealer demonstrate the 6G for you . . . show you all the exclusive advantages that will help you get top performance and big production on *your* jobs.

HD-6G
1½-yd bucket
55 belt hp
19,600 lb

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

Quick Loading Featured In Eighteen-Yard Scraper

An 18-yd scraper, which the manufacturer calls the quickest and easiest loading machine in his line, is now available.

Designated the Model C Fullpak Scraper, the unit is built wider and lower than the previous Model C to minimize rocking and to make the machine virtually tip-proof when working on steep slopes. Fast acting electric motors, triggered by fingertip switches provide precision operation. The operator's position gives him a clear view of blade, load and pusher through a pair of screened windows in the upper portion of the apron. The design of the gooseneck yoke also increases visibility. LE TOURNEAU-WESTINGHOUSE CO., PEORIA, ILL.

Concrete Mixer—Trunk Size

Called the Handy Mixer, a new portable electric mixer allows builders to mix concrete, plaster and terrazzo near their work. In addition, it can be carried to the job in the trunk of a car or the back of a station wagon. According to its manufacturer, the unit can be set up in 30 seconds.

Powered by a 1-hp motor, the mixing unit is inserted into a receptacle in a large metal tub. Capacity of the tub is five bags of pre-mixed aggregate. More than one tub can be used for several colors or types of mixes.

Unit operates off a 115-v outlet and is said to be easily operated and moved by one man. Master Vibrator Co., 561 Stanley Ave., Dayton 1, Ohio.

Prefab Panels Pare Steel Joist Cost

Here is steel joist floor and roof framing that can compete in cost with wood, say the makers of Webcore. And having tested that belief in the housing market, they are now pushing for the prefabricated panels in commercial buildings.

The panels are made up of light steel joists—usually four, 16 in. c-c—and transverse angles, also on 16-in. centers. Angles thread through L-shaped slots in the webs and stick out far enough on each side of the panel to overlap and be bolted to corresponding angles in adjoining panels.

The panels are designed to support concrete, wood or metal deck. Of the three, cast-in-place concrete makes the strongest system. It embeds the top of the joists and acts as a compressive flange. A mesh-reinforced 2½-in. slab doubles the panel strength.

Joists are trough, or flatbottom-V, shape in cross section. Two sides, or webs, slope up and out from the flat bottom and flare horizontally at the top to form flanges. The cross members, called support angles, are ¾ in. below the flanges. Bridging angles span from joist to joist below those angles.

For concrete decks, the builder lays metal pan—made by the joist-panel manufacturer—on the support angles and wire mesh across the joist flanges. Then, when he places the concrete on the pan, it embeds mesh and flanges ¾ in. For more strength, he can insert reinforcing bars and fill the joists with concrete.

If wood plank is to be used, the carpenter places ¾-in. nailer boards on board edges under the joist flanges. Bend up tabs on the angles hold boards in place.

For metal deck jobs, the joist manufacture makes steel deck panels that fit under the joist flanges and need not be welded.

Holes every 4 in. in angles and joists facilitate erection of ceilings, ducts, lights and other accessories. Clips are supplied for fastening ceiling panels directly to the bottom of joists. The joists—if not concrete-filled—are channels for conduit.

Building designers can meet different loading conditions by selecting from several standard joist sizes, and by specifying lengths as needed. WEBSTEEL FRAMING SYSTEMS, INC., 215 LINCOLN AVE., YOUNGSTOWN, OHIO.

Compass Transit From Vienna Is Offered for Trial Here

The manufacturer's representative offers a 10-day trial inspection of an "engineer's compass transit" made in Austria. Called a high precision instrument built to the American standard, this transit is priced at $670.

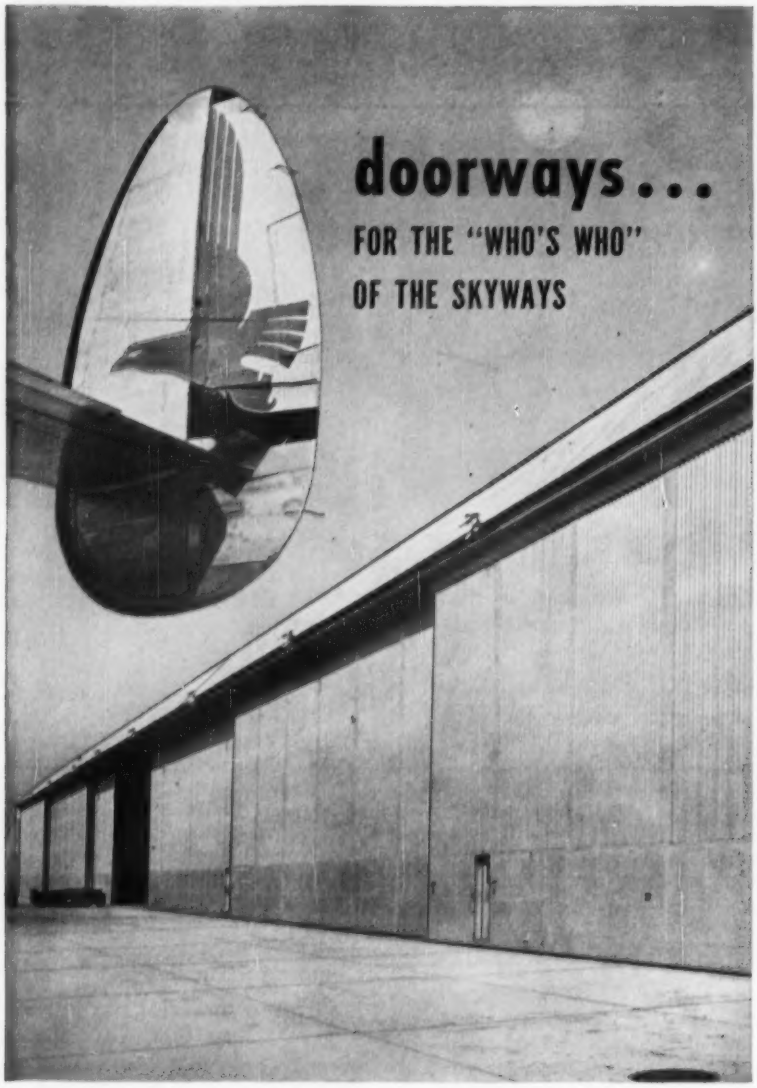
It has an internal focusing telescope and offers as its big advantage the optical plummet. The horizontal circle reads to 30 seconds; the vertical circle, one minute.

Made by Neuhoefer & Son, Inc., in Vienna, the product is sold in the U. S. by GEO-OPTIC CO., INC., 170 BROADWAY, NEW YORK 38, N. Y.

Drill Runs New Gun To Set Blind Rivets

Blind rivets (pulled rather than driven in place) can be set by a new-type gun that is designed for operation with a standard ¼-in. electric or pneumatic drill.

To operate the gun, its shaft is inserted in the chuck of the motor drill. The pulling head of the gun is slipped over the rivet stem. Then the drill



Hangar #9, New York International Airport. Planned and built for Eastern Air Lines by New York Port Authority. Contractor: Cauldwell-Wingate Co. International-built hangar doors provide two openings, each 33 feet high and totaling 461 feet in width — a combined entrance area stretching the length of some 1½ average city blocks.

INTERNATIONAL-BUILT DOORS for aircraft hangars and industrial plants alike are designed to assure these two prime advantages: (1) Fast, easy operation under any climatic conditions. (2) Lifetime weather-tightness. Sound reasons why more and more major names in American aviation and industry are served by doors "tailor made" by International.

See Complete Catalog in Sweet's Industrial Construction File No. 7a

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motor is started causing the spinning drill to turn a nut case on a movable screw shaft which, in turn, actuates a pulling head drawbolt and takes up on the rivet stem. At the same time the operator's pushing action engages the clutch face of the rivet. A head on the stem compresses the rivet shank to form a rivet head. The gun is removed from the rivet after the pulling stem breaks.

Weighing 3¼ lb, 14½ in. long, the new gun will set all lengths and diameters of aluminum, steel and monel Cherry Rivets and Townsend Commercial Rivets. TOWNSEND CO., CHERRY RIVET DIVISION, SANTA ANA, CALIF.

Desk-Drawer Drawing Board Folds Away Between Uses

An addition to modern office furniture is a drawing board in 24- and 36-in. sizes that swings in and out of the center drawer of a desk. The drawing board unit—supplied as a complete drawer—is intended to be installed in any conventional desk or table top.

Designed for use by executives and personnel whose jobs call for little drawing, and to provide extra work space in crowded drafting rooms, the unit comes complete with parallel rule attachment. It is primarily designed to go with the manufacturer's line of office furniture components. Its smaller unit has a 24-in. x 24-in. drawer equipped with a 20-in. x 15-in. board; the larger one is a 26-in. x 21-in. board in a 30 x 30-in. drawer. The catalog list prices are $26 for the 24-in. unit; $31.25 for the 30-in. unit. —ARNOT-JAMESTOWN, 730 FIFTH AVENUE, NEW YORK, N. Y.

Gold Bond "Firefighter" Roof Deck helped make these costs possible!

STONEHAM, MASSACHUSETTS ELEMENTARY SCHOOL

8 Classrooms . . . . . 1 All Purpose
1 Kitchen . . . 1 Administration
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(including sitework)
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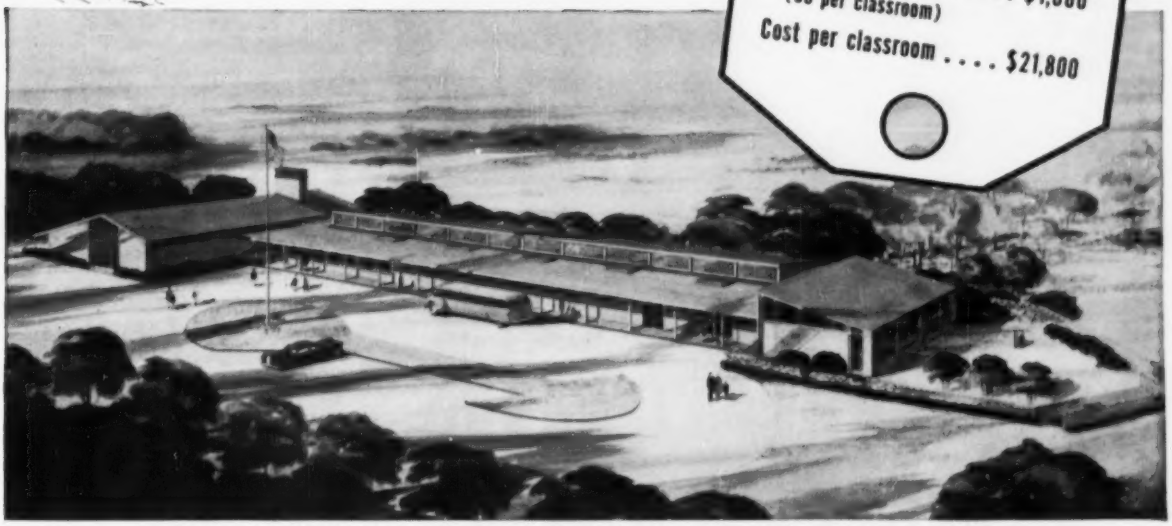
Cost per pupil $1,060
(30 per classroom)
Cost per classroom $21,800



THE COLONIAL PARK SCHOOL, Stoneham, Massachusetts. *Architect:* Perry, Shaw, Hepburn and Dean, Boston, Mass.; *General Contractor:* G. L. Rugo and Sons, Inc., Boston; *Roof Deck Contractor:* Martin Fireproofing Corporation, Boston.

The Colonial Park School cost figures above are almost revolutionary! A total contract cost of only $254,000...a cost per pupil of $1,060.

One reason construction costs stayed low for the Colonial Park School was the use of Gold Bond "Firefighter" Roof Deck and Gold Bond Econacoustic Form Board. With these two materials, a combination exterior roof and interior ceiling was built that sound conditioned, insulated and reflected light throughout the school. The Gold Bond "Firefighter" Gypsum Roof Deck becomes an integral part of the building's construction, together with 18,306 square feet of Econacoustic Form Board. "Firefighter" Roof Deck greatly reduces fire spread... a vitally important advantage in school construction. Incombustible gypsum can't transmit high temperatures or warp when exposed to hot flame.

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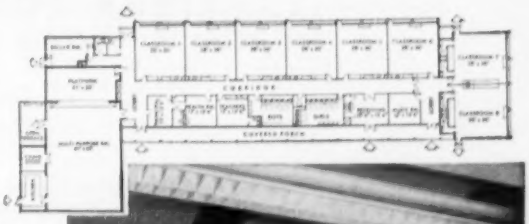

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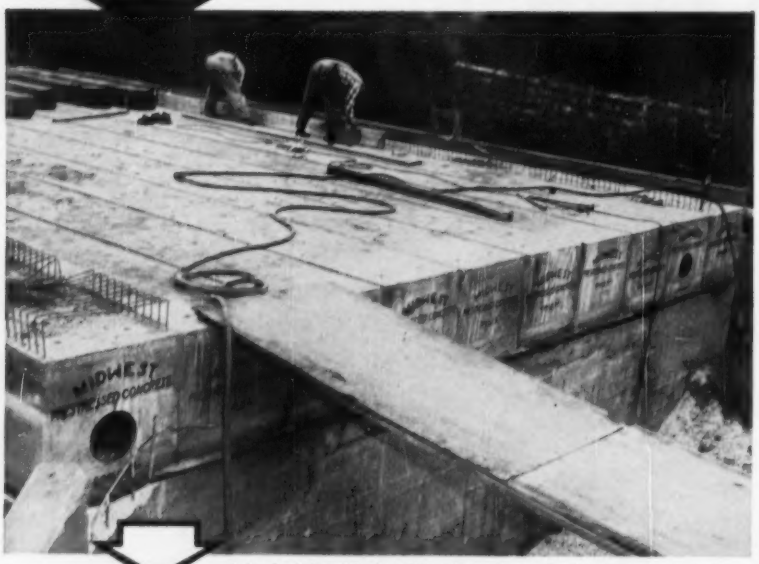
SONOVOIDS® serve as carriers for utility mains!



Lake Cook Road Bridge, Edens Expressway, Cook Co., Ill. M. J. Boyle & Co., Chicago, contractors. Precasting by Midwest Prestressed Concrete Co., Springfield, Ill.

SONOVOID®

FIBRE TUBES

for voids in concrete construction

A feature in the design and construction of this bridge was the requirement that it also carry two 10 inch gas mains across the stream. Low cost SONOVOIDS solved the problem. In casting the two outside beams three 13'10" SONOVOIDS were used. Placed in the end sections and at the diaphragms of the beams, they created a hollow throughout the length of the beams providing the carrier for the gas mains.

The ten precast beams used to form the bridge deck, were 26" x 33" x 41'6" and three 24.5" O.D. SONOVOIDS were used in each beam. Placement of the beams was done with a crane.

Although SONOVOIDS have been specifically developed to form voids in bridge deck and piles and wall, floor and roof slabs, the use of the fibre tubes in such units as carriers for utility services is practical and economical.

SONOVOIDS are for use in prestressed and poststressed precast concrete units and units cast in place.

Sizes from 2.25" to 36.9" O.D. up to 50' long. Can be supplied in specified lengths or sawed to your requirements on the job. End closures available. Order SONOVOIDS for your next job!

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Publications

Quality control method—A 36-page catalog illustrates the Rapidayton jet, reciprocating, submersible pumps and water systems; manual and automatic water softeners; and upright and submersible cellar drainers. THE TAIT MANUFACTURING CO., 500 N. WEBSTER ST., DAYTON 1, OHIO.

Concrete gunning—A 16-page catalog gives details, specifications and operating capacities of the Nucretor, Bondactor and other Airplaco concrete gunning equipment. It also answers questions about air-placed or gunned concrete. Photographs show uses of equipment. AIR PLACEMENT EQUIPMENT CO., 1009-11 W. 24TH STREET, KANSAS CITY 8, MO.

Trencher operation—A four-page brochure describes the Model 60 Everett Trencher, a tractor-mounted machine which features great versatility. One page of the brochure deals with complete specifications for the machine. THE EARTH EQUIPMENT CORP., 2036 SACRAMENTO ST., LOS ANGELES 21.

Fasteners—Two new booklets, which illustrate ways in which the Ramset fastening tool can be used, are offered by Ramset Fastening System. One illustrates use of the appliances in plant maintenance, the other for use in lining operations—particularly in lead lining of tanks. RAMSET FASTENING SYSTEM, OLIN MATHIESON CHEMICAL CORP., 12117 BEREA ROAD, CLEVELAND 11.

Skid shovels—Details of operating features and advantages of new four-in-one skid shovels are now available, fully describing mechanical points of the equipment, made for use on International crawler tractors. INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO.

Transit mixers—A 16-page bulletin, No. 256, covers the complete line of 1956 Westinghouse transit mixers, lists specifications data on five new models, and describes and illustrates features. WESTINGHOUSE TRANSIT MIXER DIVISION, LETOURNEAU-WESTINGHOUSE CO., INDIANAPOLIS.

Two-way radio—Two-way radio specifically designed to increase efficiency of ready-mixed concrete operators is fully described in a brochure that includes case histories and details of the equipment. COMMUNICATIONS PRODUCTS DEPT., RADIO CORP. OF AMERICA, CAMDEN 2, N. J.

High-strength alloy steel—Described in a 24-page bulletin are the uses and characteristics of Lukens "T-1" steel, a low-carbon, quenched and tempered alloy plate steel. Properties claimed for the new steel include a yield strength of over 90,000 psi, can be welded without preheating or stress relieving in many cases, and high impact and abrasion resistance even in extremes of heat and cold. Data are given on its high temperature properties, chemical composition, toughness, heat treatment, fabrication machining and welding characteristics. LUKENS STEEL CO., COATSVILLE, PA.

Principles of good lighting—Those looking for information on lighting will find a new 104-page booklet on the subject a handy reference. Clear and extensive illustrations plus a concise text make this a publication that is liable to hold the reader long after he has found the answer to the particular question in mind. Written in eight parts, it covers the following topics: physics of light, photometric laboratory measurements, field measurements of illumination and brightness, light control, light and color, quantity and quality of illumination, and the design of lighting systems. This last subject includes general lighting (the lumen method), supplementary lighting (point-by-point method and the lumens-per-foot method), flood lighting (the beam-lumens method), street lighting (isocandle curves), plus nomographs for lighting calculations. GENERAL ELECTRIC CO., NELA PARK, CLEVELAND 12.

Porcelain-enameled exteriors—In a 16-page illustrated brochure, a manufacturer of porcelain-enameled curtain walls and facings gives full descriptions of and specifications for two types of curtain wall panels, two types of facing panels, and a porcelain-enameled gravel stop. Working drawings and cutaway isometrics serve to give an accurate picture of the panels' cross section and mounting. D.A.P. Catalog 1956 Edition. DAVIDSON ENAMEL PRODUCTS, INC., 11024 E. KIBBY ST., LIMA, OHIO.

Drillmaster—A 32-page bulletin describes the new Drillmaster 6¼-in. blast-hole drill for quarry operators, road contractors and construction men. Bulletin 4179 also covers three types of mountings: crawler, truck and tractor, and explains the revolutionary new "down the hole" drill. INGERSOLL-RAND CO., ATTENTION: J. K. UHLER, PHILLIPSBURG, N. J.

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form full, half and quarter-round concrete columns!

Kentucky State Fairgrounds and Exposition Center, Louisville, Ky. Fred Elswick & Associates, architects and engineers. Robert Simmons Construction Co., contractors.

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In this construction, many round concrete columns of varying diameters and heights were erected as well as half-round and quarter-round columns. SONOTUBES also permitted the integration of the concrete beams with the columns. SONOTUBES were selected for the formwork because they can be easily sawed on the job to required lengths as well as to the required shapes for other than full round columns. SONOTUBES are easily handled because they are lightweight and easily erected because they require minimum bracing. SONOTUBES save time, labor and money.

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If you're interested in a service that may help you, write today for full information and a free copy of "Foremanship and Accident Prevention in Construction." American Mutual Liability Insurance Company, Dept. E-2, 142 Berkeley Street, Boston 16, Massachusetts.

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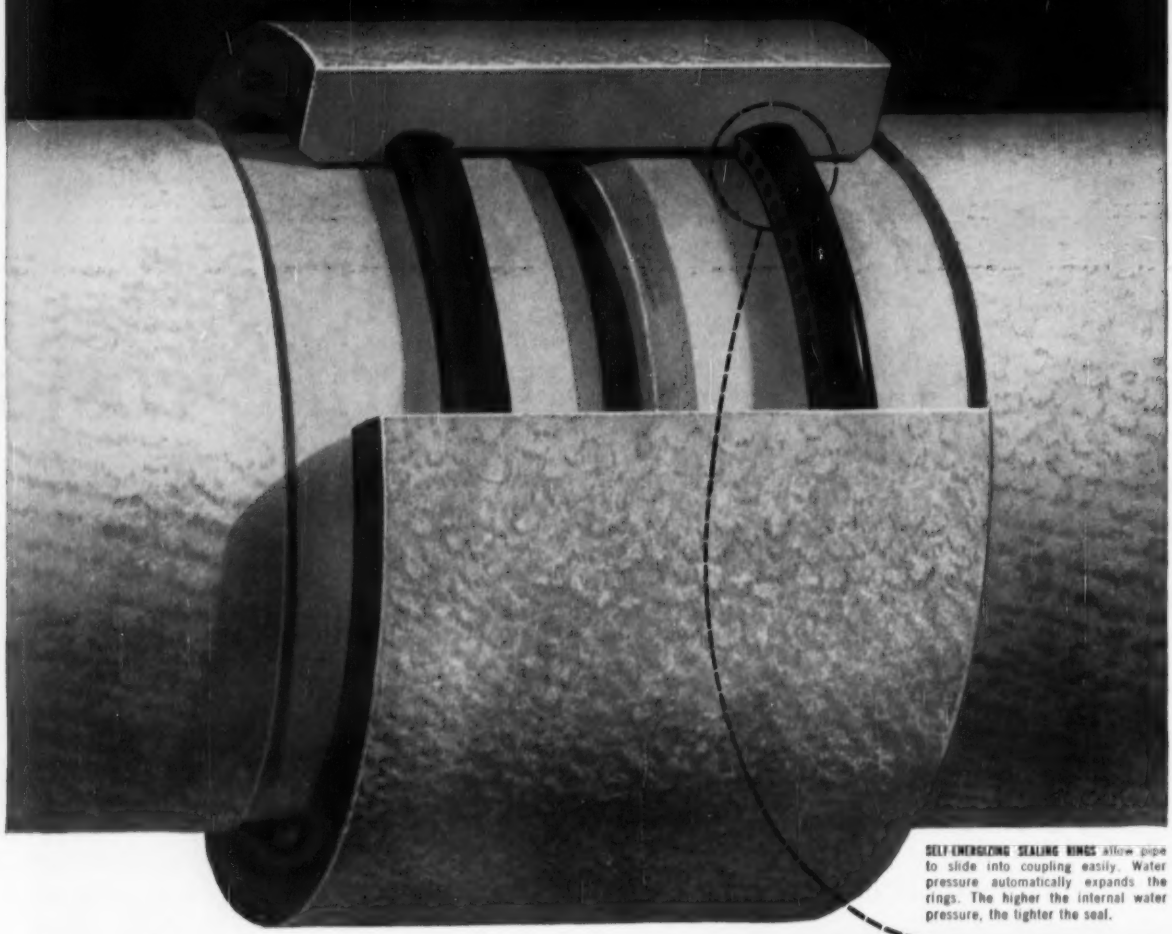

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"Century" Pipe and "Fluid-Tite" Couplings meet A.W.W.A., A.S.T.M., and Federal specifications and are approved by Underwriters' Laboratories, Inc.

New self-energizing "Fluid-Tite" sealing rings have tapered surfaces, and compress, to permit pipe to slide in easily.

When main is filled, rings expand with application of internal water pressure, creating a tighter seal.

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Bolivian power plant to use . . .

Water From "Hidden Storage"

A. E. Niederhoff

Cochabamba, Bolivia

The capital city of La Paz soon will have benefit of the only man-made underground water storage facility in Bolivia. At the Sainani hydroelectric plant, now under construction for the Canadian-owned Bolivian Power Co., tunnel workers are hewing out solid granite to form a hidden forebay that will have a capacity of 155,000 cu ft for peak power generation to supply fast growing, two-mile-high La Paz.

Sainani powerhouse will be the fifth plant built by the privately owned utility company on Bolivia's Zongo River and will be located about 60 miles north of La Paz. The plants are arranged in a step-down fashion, beginning at a headwater reservoir near the Continental Divide and proceeding downstream without any additional annual flow regulation. Waters of the Zongo River and tributaries are diverted at several places into long canals leading to the existing power plants. The Sainani plant will be the first project to use tunnels instead of canals for water conveyance.

• **Forebay in tunnel**—About 1½ mi of tunnel, driven from ten adits, will carry the discharge water from the upstream Santa Rosa plant to the 900-ft drop at the Sainani plant. Midway

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Practical guide to efficient maintenance and operation of all types of two-cycle and four-cycle diesel and dual-fuel engines used in automotive, locomotive, stationary, and marine installations. Tells how to recognize engine trouble symptoms, how to diagnose their cause, how to remedy the defect, and how to prevent its recurrence. **By C. M. Jones. 384 pp., 390 illus., $6.50**

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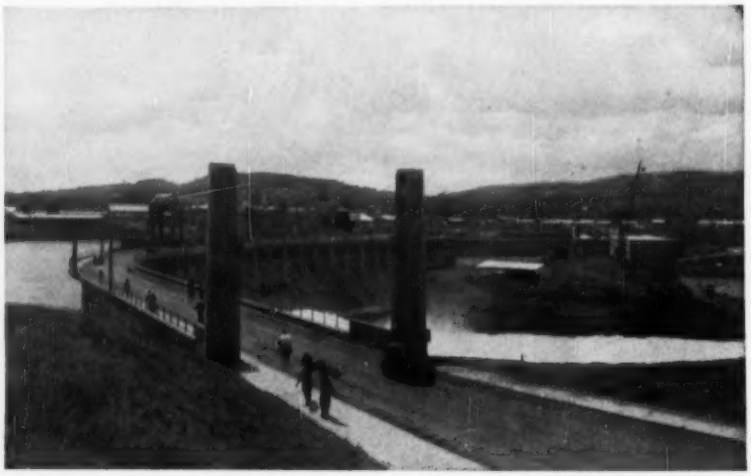
in this stretch of unlined tunnel will be the hidden forebay, 230 ft long by 26 ft wide and 26 ft high, constructed at a right angle to the main tunnel. A control chamber, also hewn out of the solid granite above the subsurface forebay, will direct the flow of 105 cfs of water from the tunnel into the forebay or into the pressure tunnel leading to a 40-in.-dia steel penstock.

The mile-and-a-half tunnel is being constructed by two La Paz contracting firms. Inchauste-Zarate-Kierig had the original contract. A portion of the work was deleted from this contract and given to Faher-Dullmann. This second contractor has driven the 6.5 x 6.5-ft tunnel at an average rate of 5 ft per 10-hr shift, using delay blasting caps and drilling and loading at an average rate of 5 lb of 62% dynamite per cubic yard of tunnel excavation. Mucking is done by hand loading into a mine car. The tunnel work, which began in April 1955, was virtually completed by April 1956.

A few short reaches of tunnel, and the portals, will have to be concrete-lined. The absence of natural sand and gravel in the region makes all concrete work costly. Aggregates are made by hand crushing the granite from the tunnel excavation and sieving it at the site. The result is a harsh concrete mix that is next to impossible to finish smoothly. A. D. Murphy, Canadian resident engineer on the project, estimated that concrete lining of the tunnel cost 183,000 Bolivianos per lin ft. Bolivianos at that moment were 4,500 per one U. S. dollar.

• **Powerhouse above ground**—The powerhouse will be built on the surface in a conventional manner. It will contain the biggest electric power generator in the country—some 11,000 kva. Two Pelton type turbine wheels will drive the generator at 500 rpm.

The combined turbine and generator weight is about 105 tons, which will have to be transported over a single lane, switchback mountain road from the railhead at La Paz. To accomplish this feat of logistics, Bruce Jenkin, general manager for Bolivian Power Co., purchased a short-wheelbase truck driven by a 450-hp diesel engine that can haul a maximum load



More and Cheaper Power From the Nile

Harnessing the White Nile River two miles below its source at Lake Victoria in Uganda is Owen Falls Dam, 2,500 ft long and 100 ft high. It awaits installation of ten 15,000-kw generators to become the largest African power generating scheme south of the Sahara—and at a cost of only $300 per kw, making it one of the cheapest post-war installations.

But this is only the beginning says the Uganda Electricity Board, revealing studies for two or three more dams over a 19-mi stretch below Owen Falls to produce an additional 500,000 kw by the 1960's. Besides providing power for the industrial development of Uganda, now leading coffee grower and second leading cotton producer in the British Commonwealth, the upper Nile dam scheme will make available more irrigation water for Egypt.

According to the Board's consultants, Sir Alexander Gibb and Partners and Kennedy & Donkin, the cost per kw for the new dams will be even less than at Owen Falls.

K-45 Kompactor compacts California 399

for Guy F. Atkinson Company on $1,736,000 Ventura-to-Ojai highway construction job

To meet density specifications and *speed* compaction, Guy F. Atkinson Company of South San Francisco, California, uses the Buffalo-Springfield K-45 Kompactor on this project between Ventura and Ojai, California.

Material before compaction on the Ventura-Ojai highway job. (Pack of cigarettes shows comparative size.)

After 3 passes by the K-45 Kompactor. Note surface uniformity. (Cigarette pack for comparison.) Density specifications also have been met in record time.

Operating at *fast* speeds, 4 to 5 mph, the self-propelled, highly maneuverable K-45 cuts compaction time substantially from that normally required. It further shortens time by giving compaction to meet specified densities with *fewer* passes.

The K-45's "Interrupted Pressure Principle" design places heavy steel pads in staggered rows around each of 4 large diameter wheels. *All* compaction effort is directed downward with minimum displacement on entering and leaving the compacted area . . . gives a better finished surface.

Send now for Bulletin S-64854. See your nearest Buffalo-Springfield distributor for a demonstration on the job.

The Standard *of Comparison*

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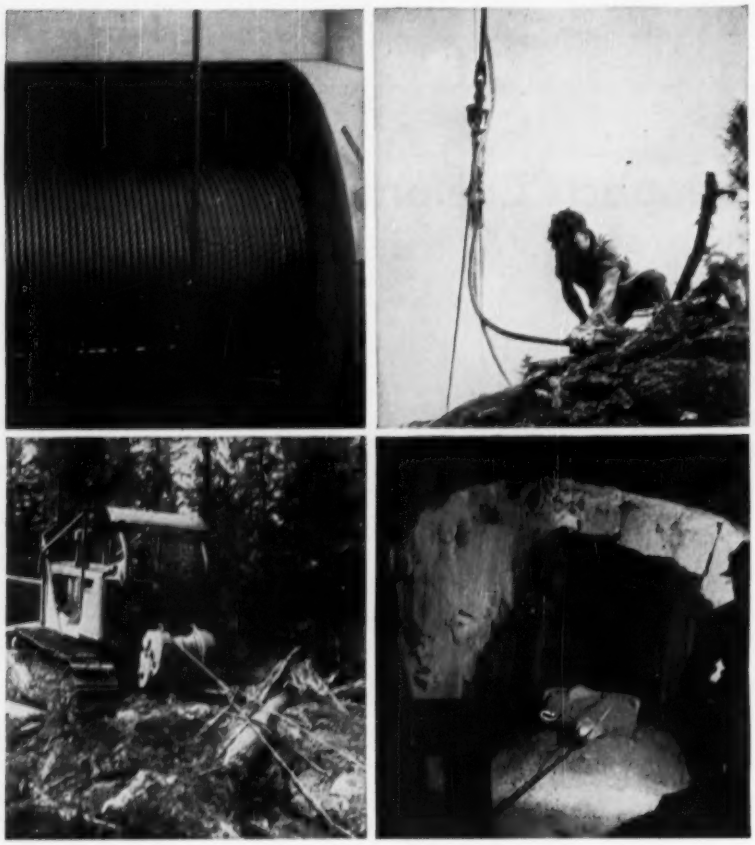
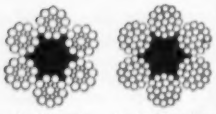


ABRASION often gives wire rope a beating. Rope is squeezed under tremendous pressure on rotary drilling drums in Texas oil fields. In the Northwest it drags under heavy logs. In mining it is scraped over rocks to operate slushers. Everywhere it is rubbed severely on winches that do not wind smooth. Under such conditions Red-Strand 6 x 19 Seale wire rope lasts longer and saves money.

What can you do better with 6 x 19 Seale Red-Strand?



6 x 19 Seale 6 x 19 Filler Wire

6 x 19 Seale has the same strength and weight as the more frequently used 6 x 19 Filler Wire, but the arrangement and size of the wires is different. You can see in the diagrams that the outer wires are fewer in number and larger in size. They provide *high resistance to abrasion* and greater wearing quality with somewhat less flexibility.

It's the perfect rope for certain jobs. Would it solve a problem for you? Be less trouble? Save more money? A Leschen man is near you. Perhaps he can help.

Send for the 64-page Leschen Wire Rope Handbook. It describes Seale and all other Red-Strand wire rope constructions.

LESCHEN WIRE ROPE DIVISION
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HERCULES Red-Strand® WIRE ROPE

of 30 tons on an 18% grade. At the plant site, the penstock and other pieces of machinery and equipment will be taken across the Zongo River by cableway.

Chief Engineer Carlos Munoz Roldan is in charge of construction for the utility company. His estimate of direct construction cost of the Sainani underground work in February 1956, was 200 million Bolivianos plus dollar cost of compressors, pumps, machinery, camps and a portion of the cost for the access road. Power from the new plant will be put on the line by September 1956. He points out that the Zongo River is only one of hundreds of similar streams with excellent hydroelectric possibilities in Bolivia that are close to load centers.

Riverbed Is Paved

Reinforced concrete floor to halt scouring at piers

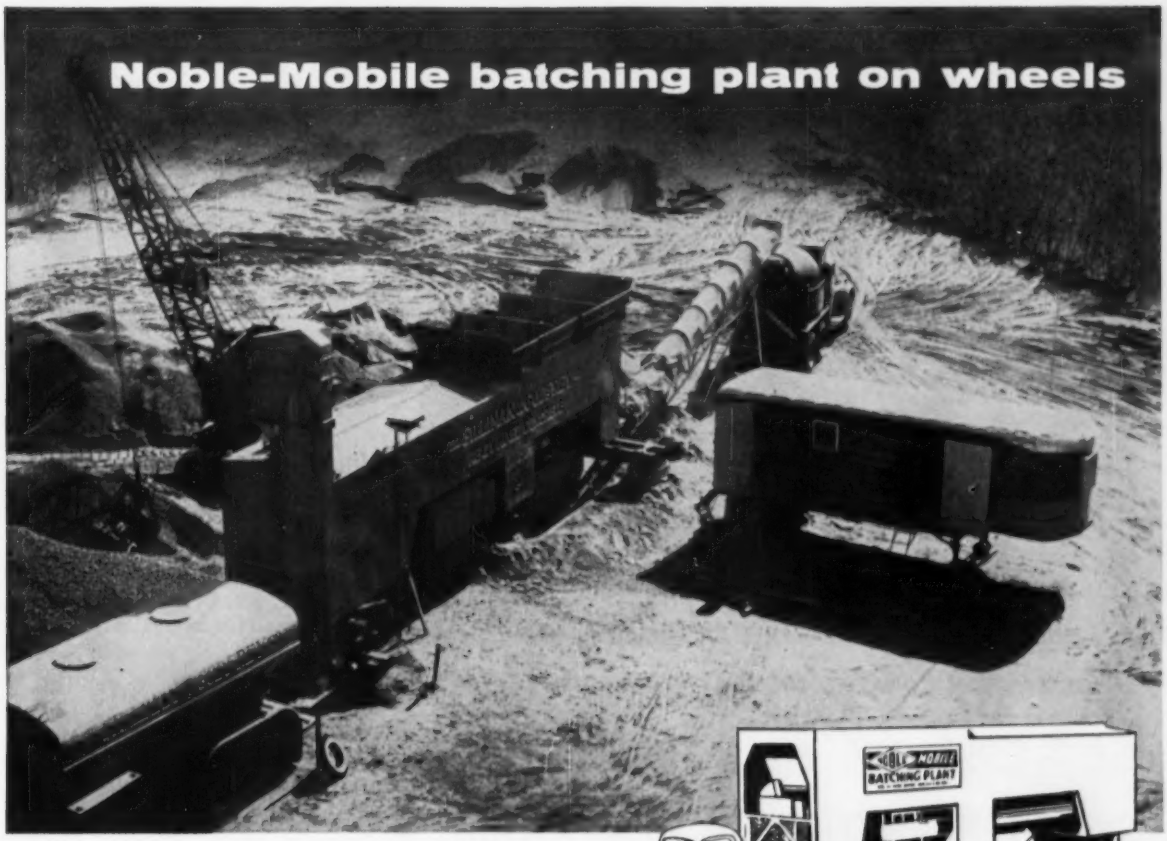
By paving a riverbed with reinforced concrete, Canadian engineers hope they have tamed a watery mustang; for the fierce Fraser River at Mission, B. C., has no respect for man-made structures. Only last July, its swift current undermined a combined railway-highway bridge pier there, causing a 150-ft steel bridge section to drop into the stream.

First estimates were that the cost of repair would be about $60,000, but subsequent investigation revealed that extensive harm had been done—to construct a new section and prevent more damage might cost $2 million. Failure was found to be caused by a 90-ft deep hole scoured out of the river bottom adjacent to one of the piers.

After removal of 225 tons of twisted steel from the river and placing of rock in the scour holes, the big question was how to prevent the mishap from occurring again. The solution was to lay a concrete floor on the riverbed to extend the full width of the river for a distance of 100 ft downstream and 60 ft upstream. This was made up of 11-ft square slabs of reinforced concrete, 10 in. thick, that were put down by divers.

Another problem then had to be faced: the possibility of the river scouring away the mud on the downstream edge of this mat, undermining it. To meet this challenge, 100-ft square brush mattresses, 3 ft thick, were fashioned in layers (similar to plywood) and laced with wire. These mattresses were then floated to the proper location and weighted on

Noble-Mobile batching plant on wheels



lets you batch at site of fringe jobs and makes those jobs pay

Photo of post-flood reconstruction job in Shelton, Conn., using Noble-Mobile. Owner: Silliman & Godfrey, ready mixed concrete.

Haul Noble-Mobile to job site like a semi-trailer • Set up in one day—no wiring, footings or crane time required • Charge aggregates with front end loader, crane or conveyor • Plant utilizes bulk cement—cement batched automatically • Excellent quality control • Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour. Covered by patents pending.

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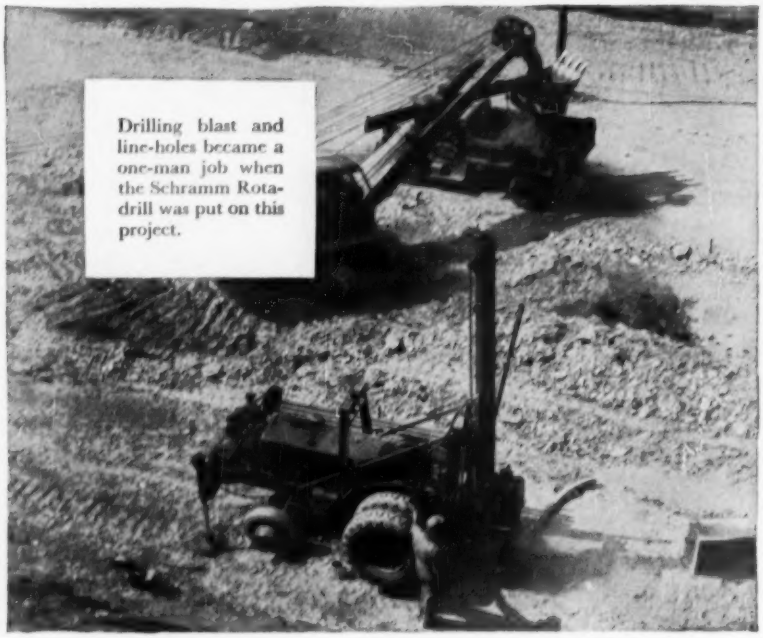

Drilling blast and line-holes became a one-man job when the Schramm Rotadrill was put on this project.

LARGE EASTERN CONTRACTOR SHATTERS RECORDS:

New cost and time records set for construction excavation

With the development of the Schramm Rotadrill, drillers everywhere gain all the advantages of rotary rock drilling with compressed air. It is believed that this comparatively new technique, with its advantages of clean, fast holes, fast set-up, and longer bit life, will completely replace the use of wagon drills.

The Rotadrill on Pneumatractor is a complete, self-contained unit. It can drill a 4¼" hole to a depth of 500 feet with 10,000 pounds down pressure. Normal drilling pressure of 20-30 psi can be instantly increased for dewatering or breaking out blockages. Rotative head has 75 RPM output and can be throttled down to complete stall while maintaining constant torque. Heavy welded structural steel mast can be operated at various angles for sloping holes.

You will find it worth while to investigate the Schramm Rotadrill on Pneumatractor. Send today for Bulletin PR-55.

Your local Schramm Dealer is listed in the Yellow Pages of your telephone directory.

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The Schramm Rotadrill, shown here with mast lowered for traveling, is mounted on the Schramm Heavy Pneumatractor. The Schramm Rotadrill is also available truck mounted.

Convenient, simple drilling controls are mounted in one bank for one-man operation. Output spindle is flanged to take various drill pipe adaptors.

their leading edge with steel rails and stones, thus sinking into position.

To give the pier a solid foundation, forty-three 72-ft steel piles were driven into the river bottom. Around these, a steel cofferdam was erected, into which went 1,400 cu yd of concrete.

Contract for rebuilding the bridge was awarded to the Foundation Company of Canada and the British Columbia Bridge & Dredging Co. Supply and erection of steel will be by Dominion Bridge Co. The bridge is owned by the Canadian Pacific Railway Co.

Jaundice Epidemic in India Spread Through Water Supply

Last winter, New Delhi, India, suffered the largest water-borne infectious hepatitis (jaundice) outbreak known to the U. S. Public Health Service. And last month, PHS released a report on the outbreak for what bearing it might have on U. S. waterworks practice.

The epidemic was spread by the Delhi water supply. Sewage contamination of the supply began last Nov. 10 and lasted about a week.

The report concludes that while the water was being sufficiently purified for bacterial contamination, it was not properly purified for viral contamination.

Viral contamination could not have been anticipated; it was the first event of its kind on record anywhere.

There was reported a failure to take proper note of chemical analyses indicating the sewage pollution.

Recommendation of the study committee included: closer attention to water analyses; increased powers for the Joint Water and Sewage Board's engineer-secretary; study of a new water supply; investigation of sewage treatment needs; arrangements for super-chlorination of existing water supplies as a temporary measure.

Subway to Be Constructed Up Mount Carmel in Haifa

A contract for the construction of Israel's first subway was signed recently between the Haifa Municipality and the engineering firm of Ounquerque Co., of Paris. This underground $7.8-million cableway will connect the downtown port area to the 790-ft top of Mount Carmel.

The subway will be composed of two rubber-wheeled trains of two cars each, connected by a cable. During the six minute trip, the capacity will be 2,000 passengers an hour in each direction.

Published in the interest of the Soft Drink Canners Association and the canning industry.

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Eliminate the hazard of broken bottles in your plant by providing your employees the safety and convenience of canned soft drinks.

Call your soft drink supplier and learn the many advantages of dispensing drinks the modern way—in cans.

QUALITY YOUNGSTOWN SERVICE

Above are illustrated two of the modern cans for soft drinks, now available for in-plant use.

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John A. Denie's Sons' ready-mix concrete plant, located at Memphis, Tennessee, showing part of their fleet of Macks, which now totals 60 and is still growing.

John A. Denie's Sons Company, Memphis, Tennessee, reports:

"To assure on-time service customers request delivery by MACKS"

Four years ago, the John A. Denie's Sons Company, one of the largest and oldest ready-mix concrete plants in the country, recognized their need for the most dependable, heavy-duty truck chassis available. Their problem was one of making ready-mix deliveries on time to almost inaccessible locations over extremely rough terrain. To solve it, Denie's tried just about every make of equipment. Finally, they purchased four Mack six-wheelers.

"Shortly after our Macks went into operation, customers started to call and request that their orders be delivered by Macks. They knew they could depend on them to make delivery on schedule, regardless of the rugged ground over which they had to travel. *Our records show that no Mack has ever failed to deliver a load on time,*" writes Mr. Forrest Ladd, Denie's executive vice president.

After noting the widespread customer satisfaction with their reliable service, and a thorough check of their operating costs, Denie's president, Mr. M. A. Moss began to increase their fleet of Macks. T- they have 60 Macks, and the number is still growing.

"Another interesting fact revealed by our operating reports," states Mr. H. O. Pommer, vice president in charge of operations, "is that Denie's has never had to replace an axle shaft, driveline, ring gear, pinion, brake drum, or reline any of the brakes on any of its Macks."

Denie's executives, like so many others, know from experience how well their investment in Macks has paid off for their company.

Let your Mack Branch or Distributor give you complete details . . . find out how Macks can improve your hauling operations. Mack Trucks, Empire State Building, New York 1, N. Y.

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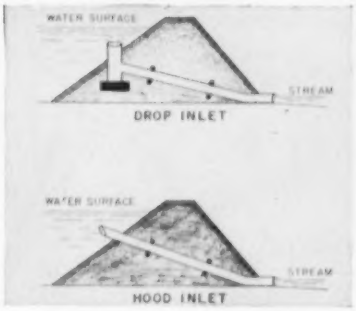
Lab Finds Real Dollar-Savers

. . . Simpler Intake

A simple improvement in pipe spillways for small dams has eliminated the need for vertical intakes.

By merely making an angle cut at the upstream end of a spillway pipe to give the correct hooded effect at the entrance—and, of course, positioning this intake end at the designed pool elevation—you can dispense with the conventional vertical intake well to which spillway pipes heretofore have been connected.



These vertical intakes for spillway pipes represent a major part of the construction cost on hundreds of thousands of small earth dams. The simplified hooded-pipe spillway can save several hundred thousand dollars a year in the building of these structures, the Agriculture Department says.

F. W. Blaisdell, hydraulic engineer in the laboratory of the department's Agricultural Research Service at St. Anthony Falls, Minn., worked out the spillway improvement. The hooded-pipe idea was not original with him. He adapted it from basic principles developed at Oregon State College, Corvallis, Ore., and described in the college's Bulletin No. 35, "Model Studies of Inlet Design for Pipe Culverts on Steep Grades."

Blaisdell's tests so far have shown that sloping spillway pipes with properly angle-cut hooded inlets will deliver full flow on any slopes up to 20%. For horizontal pipes or those near horizontal—below the neutral slope—no hooded inlets are needed. These pipes flow full without special treatment.

Conventional designs of pipe spillways used up to now have required a vertical intake of larger diameter than the outlet pipe to assure full flow through the discharge conduit—connected at a sharp angle to the vertical feeder.

Hydraulic testing of the simplified spillway pipe will continue for several months. The agricultural research service plans to publish a bulletin after the research work in completed, probably within a year.

• **Already in use**—Meanwhile, the Soil Conservation Service is adopting the idea for prompt use. SCS sees immediate application to the hundreds of thousands of stockwater and grade stabilization, or gully control, dams that it builds in the course of a two-year or three-year program.

The first draft of a technical release for SCS field personnel went out last week to a select group of engineers for review and comment. After their comments have come in, a final draft will be prepared and mailed to the entire SCS field staff this month.

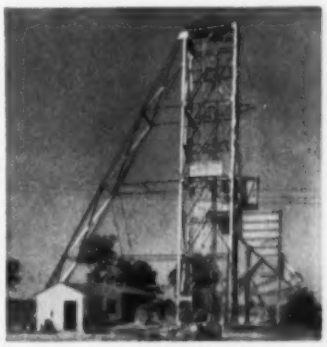
Blaisdell's research has shown that the simplified spillway pipe will flow with a minimum of head at the intake if the hood—that is the top edge of the inlet end—projects over the bottom edge of the pipe by a distance equal to or greater than three-fourths of the diameter of the pipe. The SCS technical release also mentions a baffle that Blaisdell has added at the pipe entrance to reduce turbulence and eliminate the vortex, thus increasing the capacity of the spillway pipe, particularly as the pool is drawn down close to designed level.

SCS engineers see less application for hooded-pipe spillways in their flood-control dams. In these structures, the dual considerations of sediment and trash accumulation on the one hand and state prohibitions against water storage on the other usually call for vertical intake spillways. Such an intake ordinarily is designed with the inlet above anticipated trash buildup.

. . . 90 Deg Joints

From a hydraulic standpoint, pipe laterals may join the main at any convenient angle. The curve ordinarily placed in the lateral just before it joins the main—principally with agricultural drain tile—has been shown to be unnecessary in tests also conducted at the St. Anthony Falls Hydraulic Laboratory of the University of Minnesota in Minneapolis.

This finding was reported recently by Fred W. Blaisdell as the result of



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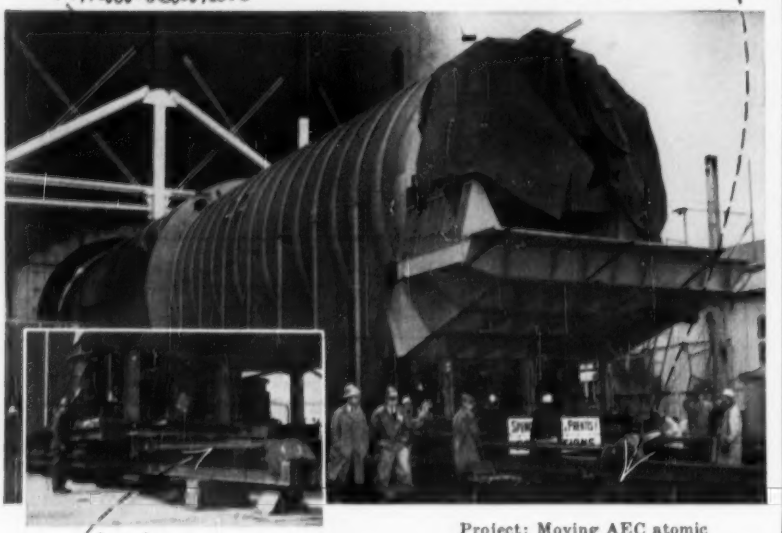

Jacks are of our own design

Project: Moving AEC atomic power plant for General Electric and General Dynamics, at Knolls Atomic Power Laboratory.

TRICKY PROBLEMS SOLVED AS 1300-TON ATOMIC POWER PLANT IS MOVED

For the sake of speed and ease, the prototype hull for the submarine *Sea Wolf* was built, to near-completion, outside the test sphere. It then became the job of Spencer, White & Prentis, as low bidder, to move it from its construction slab into the sphere.

With deflection tolerances limited to ⅛-inch on the end housing sensitive equipment, the big 1300-ton unit had to be handled with the most exacting care. On request, we will be glad to explain the methods devised by our skilled specialists—particularly for the tricky problem of transferring the hull to the steel tracks and runner beams on which it was moved the required 222 ft. Inset photo shows the jacks used for motive power, these being of our own design and manufacture.

LITERATURE ON REQUEST

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extensive experimentation at St. Anthony Falls lab.

The conclusion drawn from this research has importance to designers of drain systems. Obviously, it will be cheaper to bring the lateral into the main at the most convenient angle, disregarding earlier tendencies to reduce the angle for suposed hydraulic advantages.

Second, this information is of value to the contractor, because now he may go straight across the main with his digging machine; it is no longer necessary to stop the machine if the ditch banks are unstable, while the curve is dug by hand and the drain tile fitted to the curve, according to Mr. Blaisdell.

Third, findings of this research should be important to manufacturers of drain tile junctions.

Tests made so far have been on laterals the same diameter as the main, and are continuing now on laterals smaller than the main. The tests apply only to pipes flowing full, which is the critical, maximum flow condition for economical use of a drain tile system.

Included in the research was a comparison of 45-deg and 90-deg junctions. The difference in favor of the 45-deg junction—measured in energy loss—was found quite small. In fact, it was so small as to be judged insignificant.

Therefore, Mr. Blaisdell concludes, experimental data obtained so far show that from a practical standpoint the 90-deg junction angle is nearly as good as the 45-deg junction angle.

Organizations cooperating in the studies include the Minnesota Agricultural Experiment Station, the U. S. Department of Agriculture and the Minnesota Department of Conservation. Through the Minnesota Agricultural Experiment Station, the American Concrete Agricultural Pipe Association is contributing to the extension of these studies currently under way.

Trees Route Riprap

Belts of trees protect roadbeds against water

A project on which forestry and engineering joined hands to save the government nearly $2.9 million is now 10 years old.

When Kentucky Dam was built by the Tennessee Valley Authority, some means had to be found to protect relocated roadbeds along the lakeshore from the erosive action of waves and flood surcharge. Finding cost of

MEN OF STEEL

The East Viaduct extension to carry the roadway from the Holland Tunnel to the existing New Jersey Turnpike (Contract N-22) is being engineered and constructed by TERRY.

The story behind the brilliant construction achievements of the great TERRY organization is basically the story of men. Men of proven ability. Men of vast experience. Above all, *dedicated men* who have made it their business to master every facet of engineering, designing, fabricating and erecting. In every sense of the word, *men of steel.*

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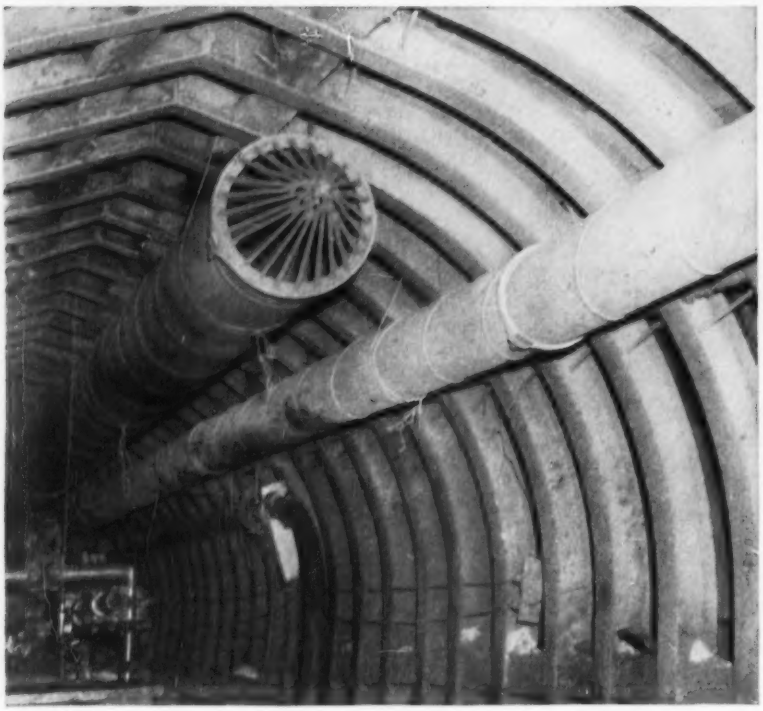

With the accent on speed in construction work, Naylor pipe has proved a practical help in providing a dependable short cut on ventilating lines.

The combination of this lockseamed, spiralwelded pipe and the one-piece Naylor Wedge-Lock coupling gives you lines that can be installed faster and easier than by other methods. The light weight of the pipe not only speeds the installation but, in addition, the exclusive Naylor structure permits the use of lighter gauge material which reduces costs without sacrificing performance. High salvage and re-use value are other economy factors to consider, too.

For moving air and water and for other materials handling jobs, it will pay you to look into all the advantages offered by Naylor pipe and Naylor Wedge-Lock couplings. Write for Bulletins No. 507 and No. 514.

NAYLOR PIPE

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riprap very high, TVA engineers decided to use belts of trees between the embankments and the water for protection. It had been noted that natural stands of trees as much as half a mile from a levee could take the turbulence out of the water and make it stand quiet against the fill.

Plantings were specified. Location, design and the selection of the species were determined jointly by TVA's engineers and foresters. Two million seedlings were planted between 1942 and 1946 to protect 56 highway projects and four railroad projects. Forty-six additional highway projects were located so as to take advantage of existing timber stands. Total cost of the tree plantations was only $54,000.

Trees used were water-tolerant species including cypress, tupelo and red gum, green and white ash, sycamore, yellow poplar, red maple, cottonwood, willow and overcup oak.

Today, 95% of the plantings have developed to the point where they will do the job for which they were designed. Some of the cottonwoods are 60 ft tall; most other species are 45 ft or higher.

New Subgrade Chemical Added to Compaction Water

A soil stabilization agent designed to decrease capillarity and increase compressive strength has been developed by the Union Starch and Refining Co. with the cooperation of the chemical division of Armour & Company, Chicago. To be sold under the trade name of Arquad 2HT, it is being field tested by the Indiana State Highway Commission in subgrade strips several hundred feet long.

Near Cloverdale, Ind., the chemical was mixed to a depth of 6 in. with a soil of high clay content, which was then surfaced with 1 in. of bitumen to seal out surface water and prevent surface abrasion yet not contribute to structural strength. Near Putnamville, Ind., two test strips have been installed on a silty soil having a low cohesion value. One strip was treated to a depth of 6 in., another to a 3 in. depth, and then topped with 2 in. of aggregate.

Because of the small amount of Arquad 2HT required (one part to 1,000 parts of dry soil by weight) and because it is merely added to the compaction water and applied with a standard spray distributor, costs are claimed to be unusually low. In chemical terms Arquad 2HT is a quaternary ammonium salt (dioctadecyl dimethyl ammonium chloride) which is made from tallow.

Men and Jobs

B. E. Torpen

To Pacific Power

Torpen has worked with Army Engineers 23 years

Bernhardt E. Torpen, whose engineering career with the Corps of Engineers has included participation in design and construction of Bonneville, McNary, Chief Joseph and other multi-purpose dams on the Columbia River, has left federal service after 23 years to accept an engineering post with Pacific Power and Light Co., Portland, Ore.

In his new job, he will work on hydroelectric projects such as the $58.7 million, 256,000 kw Swift project and the 74,000 kw Meadows development on the Lewis River and including the utility's partnership proposal for the Bureau of Reclamation's Yellowtail Dam in Wyoming.

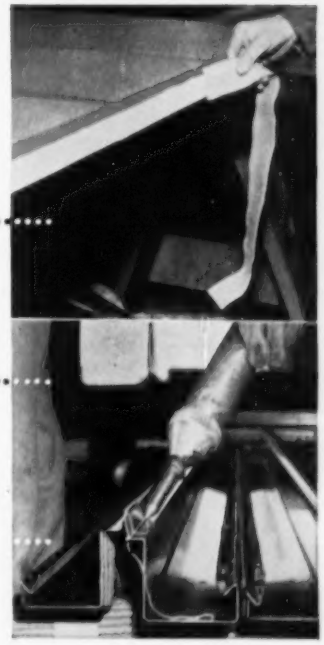
Torpen has been a special assistant to the Corps' North Pacific division engineer, Brig. Gen. L. H. Foote, since returning in February from an assignment in which he served as consultant on flood control in the Punjab region of Pakistan and on the Ganges and Bhramaputra rivers in India.

A civil engineering graduate of Washington State College in 1924, Torpen started his career with the City of Tacoma at Cushman Dam. For 30 months, starting early in 1930, he was a consultant to the Soviet government investigating hydroelectric, water supply, irrigation and navigation projects in Russia and Siberia, some of which now are in operation.

His first Corps' assignment was in 1933, as head of the design depart-

PRESSTITE
SEALING COMPOUNDS
WEATHERSEAL
25-story curtain wall skyscraper*

*Equitable Life Assurance Co.
San Francisco, Calif.



Note neat, clean application of Presstite Permagum® 576.1 sealing tape to edge of aluminum panel. Excellent adhesive qualities keep it in place while section is set into position. Once installed, it provides a permanently elastic, shrinkproof seal.

Neither water, dust, nor air will pass beyond gun-applied bead of Presstite No. 579.6, as it is applied to this stainless steel mullion. Flange will fit over edge of decorative aluminum panel to form a completely weather-tight metal-to-metal joint.

Presstite formulates and manufactures many types of sealing and caulking compounds for window glazing, general caulking, expansion joints and curtain wall construction.

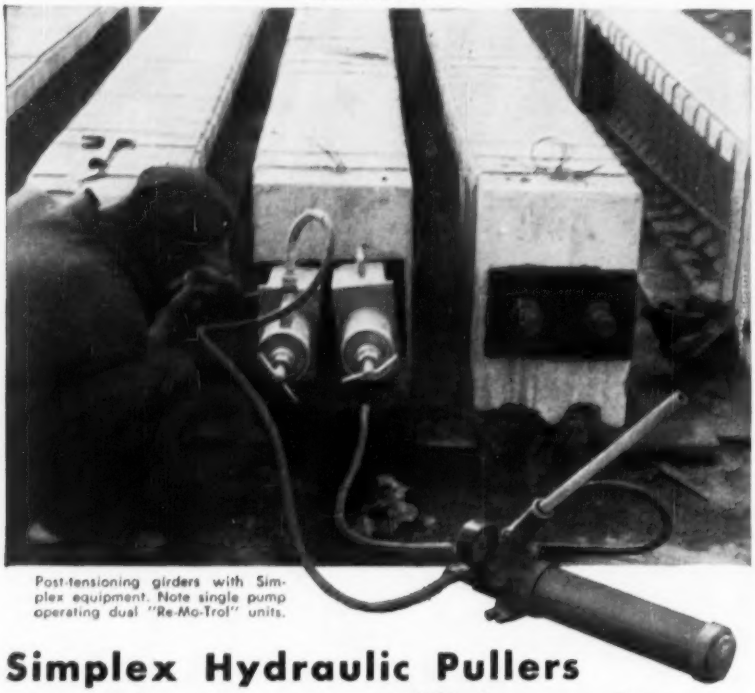
WRITE for literature, technical data, working samples.

Architects:
W. D. Peugh (deceased), San Francisco
A. J. Laubet and W. B. Glynn (successors)
San Francisco

Consulting Architect:
Irwin Clavan, New York

PRESSTITE
SEALING COMPOUNDS
PRESSTITE ENGINEERING COMPANY
3784 Choteau Ave. • St. Louis 10, Mo.

(Advertisement)



Post-tensioning girders with Simplex equipment. Note single pump operating dual "Re-Mo-Trol" units.

Simplex Hydraulic Pullers Provide Greater Efficiency in Concrete Prestressing Operations

Construction Men Acclaim Ease and Safety of Simplex Methods

Pre-tensioning and post-tensioning concrete becomes a quick, easy task with Simplex hydraulic equipment. Because of the "center-hole" pulling feature of Simplex units, wires, rods and cables can be tensioned without torque, "off center" pressures or complicated back-up devices. Eliminating these factors accounts for a 75% increase in ease and efficiency.

Simplex "Re-Mo-Trol" units consist of a "center-hole" hydraulic pulling ram connected by high pressure hose to a hand, air, electric or gasoline operated hydraulic pump. This powerful combination permits uniform stressing with maximum operator safety and speed. Once the ram is in place, the pump can be actuated safely from any nearby, convenient location.

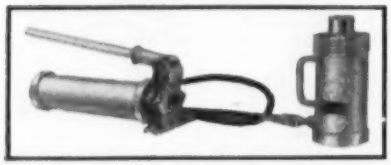
"Re-Mo-Trol" hydraulic pullers are ideally suited to prestressing operations at the job site and for use in permanent pre-tensioning beds. These versatile Simplex units are available in standard capacities from 10 to 100 tons, and can be used for heavy tonnage high-pressure tensioning of cables, rods or wires or for pushing or pulling against a holding bracket in multiple bed stressing operations.

The standard Simplex units provide a range of capacities sufficient for most applications. However, custom-built units are available up to 600 ton capacity.

Another Simplex hydraulic puller, the "Jenny", is a self-contained unit which serves as its own back-up or can be used with a simple chair to reduce set-up time.

Either device can be used not only as a puller but as a hydraulic jack or press for moving heavy equipment and the like.

For detailed data on the selection and application of Simplex Pullers for prestressing concrete and other construction jobs, write for your copy of our new bulletin: "Hydraulic 56".



SIMPLEX "RE-MO-TROL"—Remote-Controlled Unit has ram connected to hydraulic pump by high pressure hose for safe, convenient use in tight spots and dangerous locations. A pressure gauge may be installed for checking tensioning pressure.

SIMPLEX "JENNY" is a hydraulically operated center-hole puller which also serves as a press or heavy duty jack. It is a self-contained unit available in capacities from 30 to 100 tons.

TEMPLETON, KENLY & CO.

2553 Gardner Road • Broadview, Illinois

. . . Men and Jobs

ment for the powerhouse for the 518,000 kw Bonneville project. From 1934-39 he was construction engineer for Bonneville, and later directed surveys and planning for the Williamette Valley Project, a series of 19 multipurpose dams in Oregon, of which five major units have been built. As assistant chief and chief of North Pacific division engineering branch, he shared in preparation of the Corps' 308 Review Report in 1948 and design of McNary, Chief Joseph, Albeni Falls and The Dalles dams.

Men and Jobs Briefs . . .

• **Associations**—The AGC announces that **James D. Marshall**, who has served as executive director or assistant managing director for 17 years, has been given the responsibilities and authority of chief executive in the management of the association, retaining the title of executive director. He takes over from **H. E. Foreman**, now made managing director for reasons of health . . . **Alex R. McAvoy**, of Texas Industries, Inc., Dallas, is elected president of the Expanded Shale, Clay and Slate Institute.

The San Francisco Post of the Society of American Military Engineers elects as president for the coming year, **Col. William F. Cassidy**, Division Engineer, South Pacific Division of the Corps of Engineers . . . **Horace S. Hudson** of Austin, Tex., is named district engineer for Oklahoma by The Asphalt Institute.

• **Careers**—The Port of New York Authority re-elects **Donald V. Lowe** of Tenafly, N. J., as chairman of the authority . . . **E. Gordon Tallman**, formerly of the Ontario Hydro Commission, is appointed senior projects engineer of the British Columbia Power Commisison with headquarters in Victoria, B. C. . . . **Ralph R. Bushy**, South Bend, Ind., is appointed superintendent of the Akron, Ohio, city sewer department, replacing **Chris Somogy**, acting chief, who becomes engineer in charge of sewer collection . . . **George Johnston**, formerly with Beiswenger Hoch & Associates, Inc., a civil engineering firm of Akron, Ohio, is named city engineer at Cuyahoga Falls, Ohio, replacing **Thomas Sauter**, who resigned.

• **Business**—The C. F. Lytle Company, contractors located in Sioux City, Iowa, announces that **F. K. Lytle** is elected president of the company succeeding **F. W. Parrott**, who retired . . . **William F. Neale** is named a

ROADS WORTH THEIR SALT

Sta-Bilt Salt Stabilization Method Brings All-Weather Road Cost Below $400.00 a Mile

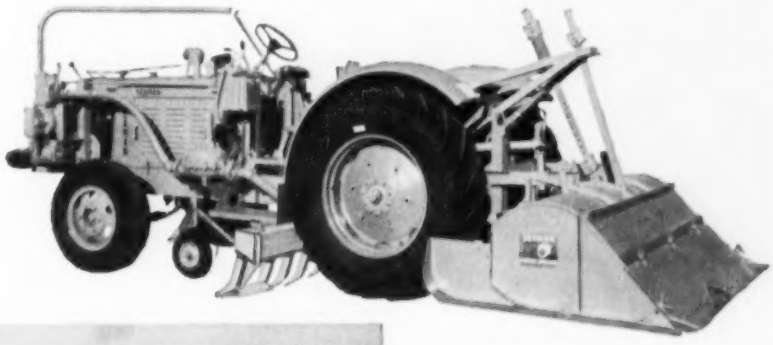
All-weather gravel roads, vital to farm, school and suburban traffic-feeding, are being built today at a cost often less than $400.00 per mile, by means of modern Sta-Bilt Salt Stabilization methods . . . roads capable of many years' use with minimum maintenance.

As its relatively low cost indicates, the Sta-Bilt Salt Stabilization method is comparatively simple, whether you stabilize the surface, or the subgrade as well. Surface should be scarified, if necessary, then brought to crown and grade. Then, after moistening, the SEAMAN PULVI-MIXER pulverizes, mixes and blends the soil to a depth of 4 to 6 inches, usually in only one pass. This is followed by another watering, then salt applied with a Century Spreader (1 or 2 pounds per square yard). Again this is mixed to full depth with the Pulvi-Mixer, then compacted with the heavy duty Seaman-Andwall Pneumatic Compactor.

The final result will be a tough, durable, all-weather gravel road withstanding years of hard traffic, with surprisingly little maintenance. A water solution of calcium chloride, or the application of road oil, or if budget permits, bituminous surfacing may be added.

CENTURY "Posi-Feed" SPREADER

Today's leading tailgate spreader, Model HY-4 provides one-man operation from truck cab. Vibratory mechanism maintains steady movement of materials. Spreader tray can be replaced with spinner unit for winter use in spreading sand, cinders, salt.



Spreading salt on Illinois county highway with Seaman-Andwall Century Spreader. Note uniformity of spread.

Final mixing of salt in wearing surface with Seaman Pulvi-Mixer, prior to final compaction.

SEAMAN TRAV-L-PLANT

Today's greatest time and money-saver in road building. Equipped with pump, tachometer assemblies, volumetric meter, spray bar to apply bitumen or water with mixing-in-place operations. Available with new UNDERBODY SCARIFIER for light scarifying.

Sta-Bilt Equipment

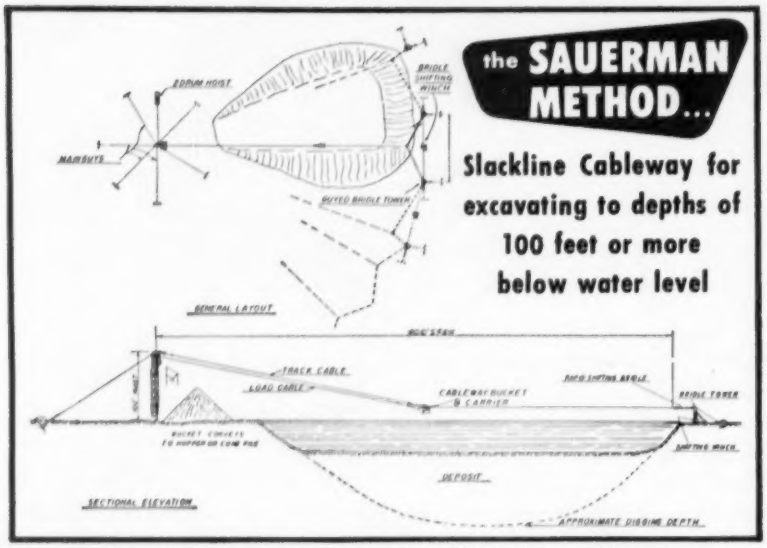
- PULVI-MIXERS
- TRAV-L-PLANTS
- MATERIALS, CEMENT SPREADERS
- PNEUMATIC ROLLERS
- STEEL WHEEL ROLLERS
- ROCK-BUSTERS

STABILIZING THE WORLD

S-A SEAMAN-ANDWALL CORPORATION

281 NORTH 25th STREET • MILWAUKEE, WISCONSIN

HOW TO DO A BETTER UNDERWATER EXCAVATING JOB



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.

Cableway at Cabinet Gorge Dam digs and hauls from tailrace 1000 ft. away. **(Full details in Sauerman News No. 143.)**

New York gravel producer switched to cableway for underwater operation of his pit. Average haul is 600 ft. from a 50-ft. depth **(Sauerman News No. 141).**

You can remove more underwater material with a long reaching Sauerman Slackline Cableway. On job after job this machine has proved to be the most efficient for this type of operation. It is especially effective where the material to be excavated has good depth and will flow to the bottom of the cut. For shallow deposits or non-caving material a rapid shifting device is used to change the line of operation.

One man controlling the hoist digs, conveys and elevates from deposit to plant over spans of 1000 ft. or more . . . across streams, lakes, bogs or deep pits. The powerful load line pull insures digging penetration. Tensioning the track cable lifts the bucket which is inhauled at high speed and dumps automatically. Gravity return completes the fast operating cycle. Bucket capacities range from ⅓ to 3½ cu. yds.

To get fast, economical long range excavation, and the shortest, most direct way from pit to pile use a slackline cableway. Contact Sauerman for specific recommendations. No obligation. Request Catalog C, showing detailed specifications and photos of slackline cableways in action on all types of deep digging jobs.

SAUERMAN BROS. INC.

632 S. 28th AVE. | BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

partner in the engineering firm of Whitman, Requardt and Associates in Baltimore, Md. . . . **John R. Armstrong, Jr.**, of Jamestown, N. C., opens offices at Greensboro, N. C., as a constultant in structural engineering.

• **Retirements**—**Carl M. Hoskinson,** superintendent of the Sacramento, Calif., city water department, after 36 years with the department . . . **Charles L. Kaupke,** Kings River watermaster, after 38 years at the post for the Kings River Water Association, headquartered in Fresno, Calif.

Obituaries

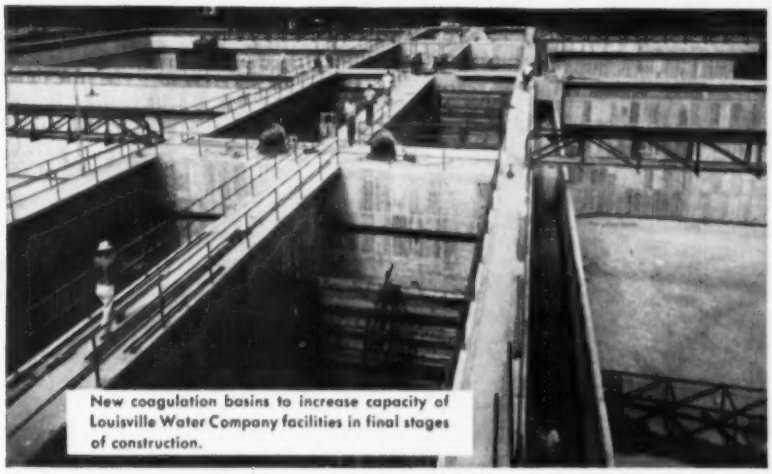
W. L. Lowe-Brown, who died March 20 in London at the age of 81, was not only one of Great Britain's most distinguished engineers, but spent some years, beginning in 1905, in the U. S. as resident engineer on the Hudson River tunnels for the Pennsylvania Railroad.

First associated with the consulting firm of Sir Benjamin Baker, Mr. Lowe-Brown worked on such outstanding projects as the London subway and the Aswan Dam in Egypt. Later he was civil engineer for the Buenos Aires Western Railway. He opened his own consulting office in London in 1924. In 1943, he joined the consulting firm of Sir Murdoch MacDonald and Partners, continuing his work on railway tunnel and drainage projects as well as acting as consultant to the North of Scotland Hydro-Electric Board.

John L. Hasson, 61, retired construction engineer and partner in the firm of Hasson and Downes Co. of New Britain, Conn., died April 13. After Mr. Hasson's retirement in 1950, the firm became Frank E. Downes Co. Hasson and Downes constructed many of New Britain's industrial structures, including most of New Britain Machine Co., the office of Stanley Works and a division of Fafnir Bearing Co.

James H. Brace, 85, president of Fraser-Brace Engineering Co., Ltd. in Montreal and vice president of Fraser, Brace & Co., of New York, died April 10. A civil engineering graduate of the University of Wisconsin in 1892, Mr. Brace had been a pioneer in Canadian hydroelectric developments. He was engaged for 20 years in engineering work on hydroelectric and waterway projects in the Great Lakes section of the St. Lawrence River. In 1908, Mr. Brace formed a partnership with Charles E. Fraser that became the construction firm of Fraser-Brace Engineering Co., Ltd.

How Pre-Fab Forms Saved Time, Material On Water Plant Job



New coagulation basins to increase capacity of Louisville Water Company facilities in final stages of construction.

Contractor Forms 200,000 sq. ft. contact area with 14,000 sq. ft. of panels

Forming a 350′ square water basin with exterior and interior walls 31′ high presents no problem to the experienced contractor. But, when the job must be done in minimum time at lowest possible cost to meet tough pouring and finishing specifications, careful planning and operation are required.

When the Henry G. Bickel Company and the Charles A. Connel Company were awarded the contract for the massive Louisville Water Company coagulation basins at Louisville, Kentucky, they selected the Uni-Form Panel System to form the 200,000 sq. ft. of contact area the job required.

Forming started fast, because the Uni-Form Panel System is ready to use when it reaches the job. Valuable time, labor and material savings were made because Uni-Form Panels require minimum alignment and bracing on 1 side only. The Uni-Forms were assembled and locked into a tight, rigid form with Uni-Form Ties supplied in exact lengths to provide automatically accurate thickness of both battered and straight walls.

One side of the form was erected, permitting easy, unhampered placement of reinforcing. Since specifications did not permit the use of chutes or tremies, pouring pockets were provided as the forms were closed to maintain positive control of concrete placement.

Fast erection and stripping features of the Uni-Form System enabled the contractor to form the entire 200,000 sq. ft. of contact area with only 14,000 sq. ft. of Uni-Form Panels. Panels were used an average of 14 times without the necessity of maintenance or repair.

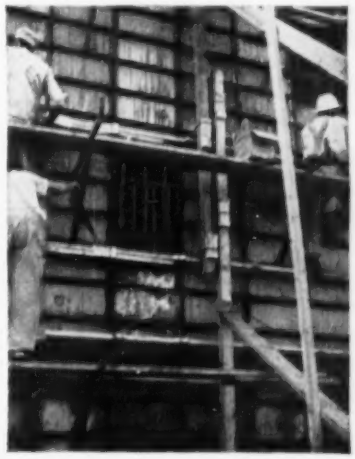
The simplicity of the Uni-Form Panel System, together with the services provided by Universal Form Clamp Co., insured fast job progress and satisfactory completion under the capable supervision of Harry Hunter, Supt.

Uni-Form Panels are versatile, high speed forming tools. They're used by the country's most successful contractors to form every conceivable type of construction. They are rented or sold. Universal Distributors and Branches are located from coast to coast. Write for Uni-Form Catalog and complete details on Uni-Forming – the modern way to form concrete.

UNIVERSAL FORM CLAMP CO.
1238 N. Kostner Avenue • Chicago 51, Illinois
Branch Offices and Warehouses:
Los Angeles • San Leandro, Calif. • Houston, Texas
Cleveland, Ohio • Baltimore, Md. • Atlanta, Ga.

Section of exterior battered wall 31′ high, showing Uni-Forming nearly complete. Uni-Form Scaffold Brackets replaced costly conventional scaffolding systems.

View of one of four clarifiers showing smooth-surfaced, clean walls which required no further finishing.



Pouring pockets permitted specified control of concrete placement.

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, L. M. FELIX, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—LB & CA

▲ **George A. Fuller**, 11 Beacon St., Boston, Mass. CA Approx. $1,000,000. DISTRIBUTION CENTER and OFFICE, Natick Industrial Center, NATICK, MASS. Sperry & Hutchinson, Co., 115 Fifth Ave., New York, N. Y. Drake, Tuthill Convery & Cueman, 100 Summit Ave., Summit, N. J., archts. CD 3/26.

▲ **Fusco-Amatruda Co.**, 59 Amith Rd., New Haven, Conn., CA $4,000,000, Regional SHOPPING CENTER, incl. department store, WILSON, CONN. Alphonse O. Griepy, et als, 150 Windsor Ave., Wilson, Conn. Awarded Apr. 13.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. J., Linden**—SCHOOLS—BA 5/28—City, City Hall, 45,000 sq. ft. Deerfield Terrace Elementary School, $797,000. Finne & Finne and C. Godfrey Poggi, 259 N. Broad St., Elizabeth, archts; Highland Ave. Elementary School, $797,000; Albert A. Kuffmann, 252 N. Broad St., Elizabeth, archt.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—John W. Johnson, supt., State Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany,

N. Y.—**Theodore Zoli Construction Co., Inc.**, P. O. Box 336, 70 Adelaide Terr., Torrington, Conn., LB $652,627. Est. $805,000. (3 bidders) relocating 3.91 mi. sect. of Rte. 10 starting about 3 mi. south of Malone and exten. northward to joint Rte. 37 between Maple and Huntington Sts., Franklin Co.

N. Y.—**E. G. DeLia & Sons Constr. Corp.**, 30 Campion Rd., New Hartford, N. Y. LB, $721,034. Est. $868,000. (10 bidders) constr. 5.72 mi. sect. of Rte. 148 bypass in Gloversville, Fulton Co.

N. Y.—**Arute Brothers, Inc.**, 560 South Main St., New Britain, Conn., LB $1,925,180. Est. $2,540,000. (10 bidders) reconstr. 6.53 mi. Tully Center to Lafayette sect. of Rte. 11, Onondaga Co.

N. Y.—**Arute Brothers, Inc.**, 560 South Main St., New Britain, Conn., LB $1,816,777. Est. $2,401,000. (9 bidders) reconstr. 4.94 mi. Lafayette to Nedrow sect. Rte. 11 and 4.41 mi. of access roads, Onondaga Co.

N. Y.—**S. J. Groves & Sons Company**, 500 Wesley Temple Bldg., Minneapolis, Minn., LB $1,485,508. Est. $1,486,000. (1 bidder) relocation 4.76 mi. sect. of Rte. 37 along south side of Massena, incl. new Grasse River Bridge, St. Lawrence Co.

N. Y.—**John Arborio, Inc.**, West Cedar St., Poughkeepsie, N. Y., LB $6,326,503. Est. $7,199,000. (5 bidders) constr. 5.79 mi. four-lane divided Rte. 17 Liberty-By-Pass and 4.56 mi. access roads, Sullivan Co.

N. Y.—**S. A. Scullen Co., Inc.**, Box 362, Waterford, N. Y. LB $1,984,886. Est. $2,185,000. (6 bidders) reconstr. relocation 7.83 mi. Rte. 9 between Pottersville and Schroon Lake, Warren and Essex Counties. Bids Mar. 28. CD 3/12.

Alco Products, Inc., 30 Church St., New York, N. Y. LB $859,826. mfg., furnishing, tunnel diversion gates for Long Sault Dam, Spec. No. PA-5-150, 79, St. Lawrence Contr. No. P35, NEW YORK. Power Authority of the State of New York, 270 Broadway, New York 7, N. Y. Bids Apr. 19. CD 3/15.

▲ **Peter Kiewit & Sons, Inc., and Morrison-Knudsen Co.**, 122 E. 42 St., New York, N. Y. LB $12,378,093. channel imprvs., Point Three points, Leishman's Point and Ogden Island near Waddington, St. Lawrence County, Spec. No. PA-5-11008, St. Lawrence Contr. No. 27, NEW YORK. Power Authority of the State of New York, 270 Broadway, New York 7, N. Y. Bids Apr. 20. CD 3/19.

▲ **NEW JERSEY-PENNSYLVANIA**—Delaware River Port Auth. Admin. Bldg., Bridge Plaza, Camden, N. J.

DRPA—**Glasgow Inc.**, Glenside, Pa. LB $2,426,339. roadway, paving, drainage, Walt Whitman Bridge, Contract P-9;

DRPA—**W. V. Pangborne Co.**, 1923 W. Montgomery St., Phila., Pa., LB $163,700, bridge approaches lighting and electrical work, Walt Whitman Bridge, Contract P-8; LB $244,134. bridge approaches roadway lighting and electrical work, Gloucester, Walt Whitman Bridge, Contract G-8. Bids Apr. 12. CD 3/20.

BUILDINGS—LB & CA

▲ **Columbus Circle Apartments, Inc.**, c/o Sylvan & Robt. Bien, archts., 33 W. 46 St., New York 19, N. Y. Owner Builds. $4,500,000. two 14 story APARTMENTS, 910-24 Ninth Ave., 1-17 Columbus Ave., NEW YORK, N. Y. CD 10/4/55.

▲ **Vincent J. Smith, Inc.**, Johnson City, N. Y. and **William L. Crow Constr. Co.**, 101 Park Ave., New York, N. Y. CA Est. $5,000,000. general constr., 72,000 sq. ft. ADMINISTRATION BLDG., 152,000 sq. ft. ENGINEERING STRUCTURE, 184,000 sq. ft. MANUFACTURING BLDG., OWEGO, N. Y. International Business Machines, 590 Madison Ave., New York 22, N. Y. CD 2/14.

▲ **Marberne Development Co.**, c/o Joseph Borgoliszo, 655 Clinton Ave., Newark, N. J., Separate Contracts $10,000,000, 1,000 unit RESIDENTIAL DEVELOPMENT, Harding Highway, MAYS LANDING, N. J. Joseph F. Borgoliszo, c/o owner, project engr.

▲ **Freda Enterprises, Inc.**, c/o Carmed Freda, Lavalette, N. J., Separate Contracts. $2,800,000. 350-unit RESIDENTIAL DEVELOPMENT, SEA ISLE CITY, N. J.

C. H. **Schwertner & Sons, Inc.**, 1220 Hamilton St., Phila., Pa. CA $750,000. 2, 3 and 4 story, 100,000 sq. ft. brick, concrete, steel, rein-conc. MILL addn., DOWNINGTON, PA. Downington Paper Co., Downington, Pa. Bids Apr. 6. CD 4/6.

▲ **Louis Feldsher & Sons**, 2534 W. Thompson St., Phila., Pa. CA $1,000,000. APARTMENT and OFFICE, parking area, Belmont Ave. and Conshohocken Rd., PHILA., PA. Owner, c/o contractor. A. Hyman, 912 Gilham St., Phila., Pa., archt.

▲ **Paul Tishman General Contractor, Inc.**, 21 E. 70 St., New York, N. Y. CA $3,478,689. general constr. North Allen HOUSING Proj., 372 units, 10 and Poplar Sts., PHILA., PA. Phila. Housing Auth., 42 S. 15 St., Phila., Pa. CD 3/7, under LB.

▲ **Wark & Co.**, 1920 Sansom St., Phila., Pa. LB $1,893,700. general constr. JUNIOR HIGH SCHOOL, UPPER DARBY, PA. Upper Darby Twp. School Auth., Upper Darby, Pa. Bids Apr. 16. CD 3/22.

Charles H. Tompkins, 907 16 St. N. W., Wash., D. C. LB Est. $750,000. OFFICE, 22 and C Sts. N. W., WASH., D. C. National Assoc. of Life Underwriters, 11 W. 42 St., New York, N. Y. Bids Mar. 27. CD 3/16.

▲ **Rosann, Inc.**, c/o Arnold Matter, New Castle, Del. Separate Contracts, $1,300,000. RESIDENTIAL DEVELOPMENT, Liftwood Section, NEW CASTLE, DEL.

SOUTH

BUILDINGS—BA

▲† **Ill., Rock Island**—POST OFFICE, etc.—BA About 5/29—General Services Admin., P. Bldgs. Service, General Services Bldg., Wash. 25, D. C., lease purchase project for construct and finance post office and court house. $1,600,000. William Stuhr, 1800 Third Ave., Rock Island, and J. Fletcher Lankton & John N. Ziegele & Assocs., 1100 Main St., Peoria, archts. CD 7/5.

▲ **Ill., Moline**—SCHOOL—BA 6/1—Moline Bd. Educ., 1619 11 Ave., Senior High School. $3,200,000. Swanson & Maiwald, First National Bank Bldg., archts. and engrs. CD 3/21.

HEAVY CONSTRUCTION—LB & CA

▲† **Atlantic Gulf & Pacific Co.**, 15 Park Row, New York, N. Y., LB $2,232,205, est. $1,539,684 (5 bidders) dredging Wilmington Harbor, CIVENG-31-075-56-26, NORTH CAROLINA. U. S. Eng., 308 Customhouse, Wilmington, N. C. Bids Apr. 17. CD 4/12.

▲ **FLORIDA**—State Road Dpt., Tallahassee,

Powell Bros., Inc. Heavy Constructors, Inc., Box 281, Fort Lauderdale, Fla., LB $2,042,715, est. $2,000,000 6 lane, 2,155 ft. bridge utilizing precast-prestressed concrete beams and composite I-beams on concrete piles with conc. caps, pedestal type piers on conc. piles and steel H-type piles 0.408 mi. State Road A-1-A, McArthur Causeway between Miami and Miami Beach, Proj. U 039-1 (3) Job 80706-202, Dade Co. Bids Apr. 17. CD 3/27.

BUILDINGS—LB & CA

▲ **John Wile Constr. Co.**, 826 Humler Ave., Louisville, Ky. CA $2,049,000. general constr. HOSPITAL, NURSES HOME, SHIVELY, KY. St. Mary & Elizabeth Hospital, 1367 S. 12 St., Louisville, Ky. Bids Mar. 13, awarded Apr. 17. CD 3/16, under LB.

MIDDLE WEST

BUILDINGS—BA

Wis., West Allis—SCHOOL, etc.—BA 5/21—Bd Educ., 7510 W. National Ave., 1 and 2 story, 200x300 ft. elementary school and fieldhouse. $831,000. Lindl-Schutte & Assocs., 808 N. 3 St., Milwaukee, Zone 3, archts. CD 12/7.

▲ **O., Solon**—WAREHOUSE, etc.—Bids Asked—Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 22, Pa. warehouse and office bldg., 56,000 ft. warehouse space; 10,000 ft. office space, 1 story, brick, stainless steel for offices; brick facing over cement block for warehouse. $1,000,000. Wm. M. Varker, 439 Madison Ave., New York, N. Y., engr.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 19,

Fischer Constr. Co., 4053 Clifton Ave., Cincinnati, O., CA $3,863,807, est. $4,282,300, Type T-71 and structures 6.573 mi. USR 25-Sect. 13.13. IN-196 (4), Miami Co. Bids Apr. 3, CD 4/10, under LB.

▲ **Mt. Vernon Bridge Co.**, Sugar and Adams Sts., Mt. Vernon, O., LB $1,926,760, (4 bidders) furnishing, fabricating and erecting 3,775 tons of steel on Calumet Skyway Toll Bridge Project, CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Apr. 6. CD 3/26.

▲ **WISCONSIN**—State Hy. Comn., State Hy. Office Bldg., Madison,

Wis.—**James Cape & Sons Co.**, 701 Water St., Racine, Wis. CA $749,035. (13 bidders) c. conc. 10.084 mi. Contr. 1, Mt. Horeb-Verona Rd. U. S. Hys. 1, 18 and 151, Proj. F-017-2 (41), Dane Co.;

Wis.—**Linnan Const. & Engr. Inc.**, Brookfield, Wis., CA $78,679 (5 bidders), base, c. conc. 0.235 mi. Contr. 1, South 70th St. (West National Ave.-West Greenfield Ave.), City of West Allis, Contr. 1, Proj. US 5737 (1), Milwaukee Co.;

Wis.—**H. Turner & Son**, Boscobel, Wis., CA $110,673 (2 bidders) Contr. 1, grade, base, surf. 0.552 mi. Lincoln Ave. City of Fennimore, U. S. Hys. 18 and 61. Proj. T 08-1 (14), Grant Co.;

Wis.—**Highway Pavers, Inc.**, 1409 N. 27 St., Milwaukee 8, Wis., CA $294,480 (11 bidders) Contr. 1, b. conc. West County Line-Waterford, S. T. H. 20-West County Line, East County Line-North County Line and West County Line- S. T. H. 83 Rd. S.T. Hys. 20, 24 and 83, Projects T-0345 (3), T-0818 (5), T-0480 (3), T-0480 (4) Racine and Walworth Counties;

Wis.—**Warren Wieseler**, 2300 N. Superior St., Appleton, Wis., CA $202,523 (7 bidders) base, b. conc. pavement, Contr. 1, Smith and Brazeau Aves., City of Oconto, U. S. Hy. 41. Proj. U 02-5 (3), Oconto Co.;

Wis.—**Mathy Constr. Co.**, 520 Main St., LaCrosse, Wis. CA $97,423 (4 bidders) Contr. 1, single aggregate bit. surf. (modified) 4.71 mi. Independence-Elk Creek Rd., S. T. Hy. 93, Proj. T 090 (6), Trempealeau Co.;

Wis.—**Edward Kraemer & Sons**, Plain, Wis., CA $982,833, (11 bidders) b. conc. 22.465 mi. Contr. 1, Mercer-Hurley Rd., U. S. Hy. 51, Proj. T 05-4 (19), Iron Co.;

Wis.—**Badger Bituminous, Inc.**, Barneveld, Wis., CA $173,445 (12 bidders) b. conc. 10.181 mi. Contr. 1, Shullsburg-Gratiot Rd., S. T. Hy. 11, Proj. T 030-1 (9), Lafayette Co.;

Wis.—**Baumgardt Constr. Co.**, 305 Clarence St., Dodgeville, Wis., CA $135,936, Contr. 1, b. conc. 7.2 mi. KS. T. H. 80-East County Line and West County Line-Shullsburg Rds., S. T. Hy. 11, Projects T 030-1

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South

Middle West
West of Mississippi
Far West

PROPOSED WORK

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways

Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† **Federal Government**
▲ **Project of $1,000,000 or over.**
ENR **Engineering News-Record**
CD **Construction Daily**

For additional reports see Construction Daily.

(6) and T 0301- (7), Grant and Lafayette Counties. Grand total $2,825,029. Bids Apr. 10. CD 3/27.

BUILDINGS—LB & CA

▲ **Oakwood Acres, Inc.,** Joseph Porath, pres., 2828 Euclid Ave., Cleveland 15, O. Own Forces. $7,500,000. 700 HOMES, LORAIN, O.

▲ **Aluminum Co. of America,** 1200 Alco Bldg., Pittsburgh 19, Pa., CA Own Forces and Separate Contracts, $80,000,000. 150,000 ton primary aluminum reducation plant, incl. ingot casting equip., carbon plant, machine and electric shops, office, 375,000 kw steam power plant and docking facilities, in Warrick County, near BOONVILLE, IND. CD 4/19.

▲ **Consolidated Constr. Co.,** 20 E. Franklin St., Baltimore, Md. CA, $1,500,000. brick mfg PLANT, Kennedy Ave. and Grand Calumet River, HAMMOND, IND. Harbison Walker Refractories Co., Farmers National Bank, Pittsburgh, Pa.

▲ **The Austin Co.,** 16112 Enclid Ave., Cleveland, O. CA, $16,000,000. design and construct PLANT, NORTH LAKE, ILL. Automatic Electric Co., 1033 W. Van Buren St., Chicago, Ill. CD 6/2.

▲ **Stone & Webster Engineering Corp.,** 49 Federal St., Boston, Mass. CA Est. $10,000,000. hardboard MILL, 72 acre site, ALPENA, MICH. Abitibi Power & Paper Co. Ltd., 408 University St., Toronto, Ont. CD 9/7.

▲ **Stieber Realty Co.,** 4650 Chene St., Detroit 7, Mich. Owner Builds. $2,000,000. Moravian SUBDIVISION Metropolitan Beach Rd. and Moravian Dr., CLIFTON, MICH.

▲ **Champion, Inc.,** P. O. Box 231, Iron Mountain, Mich. CA $1,389,890. construct and finance 100 HOUSING UNITS, Kinross Air Force Base, KINROSS, MICH. U. S. Eng., 600 E. Jefferson Ave., Detroit, Mich. Bids Feb. 28. CD 9/28, under airports.

▲ **M. M. Robinson,** 2013 Dime Bldg., Detroit 26, Mich. Owner Builds. $2,000,000. Pontiac SHOPPING CENTER, Telegraph Rd. and Elizabeth Lake Rd., PONTIAC, MICH. Charles N. Agree, Inc., 1140 Book Bldg., Detroit 26, Mich., archts.

▲ **Colwell Homes, Inc.,** 4057 West Maple St., Bloomfield, Mich. CA Est. $1,000,000. 100 HOMES, 15 Mile Rd. and Gamma St., WALLED LAKE, MICH. Rose-Hill Realty, 14601 E. Seven Mile Rd., Detroit, Mich.

WEST OF MISSISSIPPI

BUILDINGS—BA

▲ **Tex., Texas City**—HIGH SCHOOL—BA 5/15—Texas City Independent School Dist., Texas City, high school. $2,000,000. Extended date. Wyatt C. Hedrick, 5201 Fannin St., Houston, engr.-archt. CD 4/4.

▲ **Tex., Austin**—CONVENTION CENTER-AUDITORIUM—BA 6/5—City, City Hall, convention center-municipal auditorium, $2,000,000. Jessen, Jessen, Millhouse & Greeven, 2816 Hemphill Park, and Page, Southerland & Page, 602 West Ave., archts. Wilson & Cottingham, Brown Bldg., and Blum & Guerrero, 1111 Neches St., engrs. CD 11/24/54.

▲ **Tex., Beaumont**—SHOPPING CENTER—Bids Asked—Ben Rogers Interests, Beaumont, 45-store unit shopping center, $2,250,000. Irving R. Klein & Assocs., 1317 Austin St., Houston, archts. CD 11/21.

HEAVY CONSTRUCTION—LB & CA

La Crosse Dredging Corp., 310 S. Michigan Ave., Chicago, Ill., CA $930,000. embankment fill Area B, City Island Development, DUBUQUE, IOWA. Bd. Dock Comrs., F. E. Meyers, secy., City Hall, Dubuque, Iowa. Bids Apr. 3.

▲ **TEXAS**—Texas Turnpike Auth., 214 First Federal Savings Bldg., Austin, Zone 1,

Flenniken Constr. Co. & L. H. Lacy Co., P. O. Box 634, Shreveport, La., LB $2,599,344, paving 7.96 mi. from approx. 1.1 mi. east of Watson School Rd. to approx. 0.1 mi. east of Chalk Hill Rd. Proj. D-FW 48, Tarrant and Dallas Counties. Bids Apr. 17. CD 3/28.

† **D. D. Skousen & Son,** Springer Bldg., Albuquerque, N. M. CA $732,801, est. $1,032,324. channelization of Rio Grande, South boundary of Fish & Wildlife Refuge to San Antonio, Socorro area, Sta. 0 plus 00 to 627 plus 00, Middle Rio Grande Proj., Spec. DC 4640, NEW MEXICO. Bureau Reclamation, Dpt. Interior, Albuquerque, N. M. Bids Mar. 20, awarded Apr. 12. CD 3/28, under LB.

▲† **Allen M. Campbell Co.,** Box 312, Alamogordo, N. M. LB $1,109,660. railroad, roadway, parking areas, etc., Static Missile Test Facility, Holloman Air Force Base, ENG-29-005-56-76, ALAMOGORDO, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Apr. 10. CD 3/28;
Brodie Constr. Co., Box 2064, Amarillo, Tex. LB $1,109,897. gas, water, sanitary sewer systems (Alamogordo, N. M.).
Hammond Iron Works, Box 310, Provo, Utah. LB $226,393. 300,000 gal. elevated steel water tank, 1 m.g. concrete ground water storage tank (Alamogordo, N. M.).

BUILDINGS—LB & CA

Lakeland Builders, Inc., 19 St. and Kenwood Parkway, Minneapolis, Minn. Owner Builds. $800,000. 85 HOUSES, FRIDLEY (P. O. MINNEAPOLIS), MINN. Ackerberg & Cooperman, 1216 Nicollet Ave., Minneapolis, Minn., archts.

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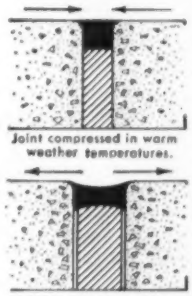
★ Keeps joints sealed under severest conditions of Traffic and Temperature

★ Pumped directly into joint from melting kettle



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For sealing keyed construction or contraction joints in vertical walls. Maintains bond with concrete at temperatures to sub-zero. Simple installation insures a moisture-tight seal of the joint.

Keyed construction joints in vertical walls and horizontal slabs.

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6051 WEST 65th STREET • CHICAGO 38, ILLINOIS

▲ **Klem-Weissman Constr. Co.,** 3 County Fair Lane, St. Louis 24, Mo. Owner Builds. **$1,000,000.** 54 RESIDENCES, Country Fair Acres subdivision Ladue Rd. west of Lindbergh Blvd., ST. LOUIS COUNTY, MO.

▲ **Ragnar Benson, Inc.,** 4744 Rice St., Chicago, Ill. CA Est. **$1,000,000.** 1 story, brick, steel 50,000 sq. ft. REGIONAL HEADQUARTERS, MISSION, KAN. Farmers Insurance Co., Centennial Bldg., Kansas City, Mo. CD 9/10/54.

▲ **Brown & Root, Inc.,** Box 3, Houston, Tex. LB **$1,162,123.** CENTRAL HEATING and COOLING PLANT and ditsr. sys., HOUSTON, TEX. Rice Institute, 6100 Main St., Houston, Tex. Bids Apr. 11. CD 4/9.

▲ **Spartan Constr. Co.,** Box 14397, Houston, Tex. LB **$1,298,455,** est. $1,100,000. JUNIOR HIGH SCHOOL, SPRING BRANCH, TEX. Spring Branch Independent School Dist., Spring Branch, Tex. Bids Apr. 11. CD 3/8.

FAR WEST

BUILDINGS—BA

▲ **Wash., Seattle**—TEACHING HOSPITAL—BA 5/15—University of Washington, Zone 5, teaching hospital. $3,000,000. Extended date. CD 4/4.

HEAVY CONSTRUCTION—LB & CA

▲ **WASHINGTON**—State Hy. Dpt., Transportation Bldg., Olympia,

United States Steel Co., Tower Bldg., Seattle, Wash., LB $1,596,152, superstructure for Maple St. Bridge, Spokane, Spokane Co. Bids Apr. 17. CD 3/21.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,

Fredericksen & Kasler, 212 13 St., Sacramento, Calif., CA **$2,285,809** 7 mi. freeway, frontage roads, ramps, 7 bridges, interchanges and 3 pumping plants, U.S. 99 between Califa and Merced Co. line Madera Co. Bids Mar. 28, awarded Apr. 17. CD 4/10, under LB.

▲ **Baker-Anderson Co. and Ukropina-Policy-Kral** 201 E. Las Tunas Dr., San Gabriel, Calif., CA **$4,505,163** Middle feeder pipe line from LaVerne to Baldwin Park of Colorado River Aqueduct Sys., LOS ANGELES, CALIF. Metropolitan Water Dist. of Southern Calif. 306 W. 3 St., Los Angeles, Calif. Bids Apr. 5. CD 4/16, under LB.

BUILDINGS—LB & CA

▲ **Hilp & Rhodes,** 918 Harrison St., San Francisco, Calif., CA **$7,000,000,** 6 STORES in Concord Park Shopping Center, Willow Pass Rd., CONCORD, CALIF. Caldwell-Banker, 425 15 St., Oakland, Calif.

▲ **Rainer Constr. Co.,** 190 MacArthur Blvd., Oakland, Calif., Owner Builds, **$3,300,000.** 200-HOME subdivision, Winton Ave. and Eastshore Freeway, HAYWARD, CALIF. Irwin Johnson, 449 W. MacArthur Blvd., Oakland, Calif., archt.

▲ **Rainier Constr. Co.,** 190 MacArthur Blvd., Oakland, Calif., Owner Builds, **$1,106,000,** 79 HOME subdivision Tennyson Rd., HAYWARD, CALIF. Irwin Johnson, 449 W. MacArthur Blvd., Oakland, Calif., archt.

▲ **Oddstad Homes,** 727 Shasta St., Redwood City, Calif. Owner Builds, **$1,317,400,** 122 HOME subdivision at Crestwood Valleywood, Carmel and Maywood Drs., HILLSBOROUGH, CALIF.

▲ **James I. Barnes Constr. Co.,** 1119 Montana Ave., Santa Monica, Calif., LB **$1,349,300** (6 bidders) general contract, 4 story, 152,000 sq. ft. branch OFFICE, State Dpt. Employment, LOS ANGELES, CALIF. State Div. Arch., 1100 S. Grand Ave., Los Angeles, Calif. Bids Apr. 18. CD 3/13.

CANADA

BUILDINGS—SLC

▲ **Que., Montreal**—COLLEGE—Rev. Jesuit Fathers, 3200 Cote St. Catherine Rd., soon lets contract 8 story, 125x250 ft., rein.-con., masonry college addn. $1,000,000. Brais & Savard, 7084 St. Denis St., and B. Depatie, 6897 St. Lawrence Blvd., archts. Brett & Ouellet, 501 Pine Ave. W., engrs. CD 7/27.

▲ **Que., Sherbrooke**—CATHEDRAL—Roman Catholic Diocese of Sherbrooke, 54 Convent St., soon lets contract cathedral -superstructure, Marquette and Convent Sts. $1,000,000. Audet, Tremglay & Audet, 1100 Prospect St., archts. CD 2/9.

HEAVY CONSTRUCTION—LB & CA

▲ **New West Constr. Co. Ltd.,** 10480 113 St., Edmonton, Alta., CA, **$1,762,035,** grading mile 145.0 to mile 194.0 Prince George north to Dawson Creek, BRITISH COLUMBIA. Pacific Great Eastern Ry. Co., B. E. Valde, ch. engr., Squamish, B. C. Bids Apr. 9. CD 3/2.

▲ **Dupont Constr. Ltd.,** 355 Robers Rd., Toronto, Ont., LB **$1,618,688** (2 bidders) John St. Pumping Station exten., TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Mar. 26. CD 3/7.

BUILDINGS—LB & CA

▲ **Commonwealth Constr. Co. Ltd.,** 700 Taylor St., Vancouver, B. C., CA, **$1,661,636.** 5 story, rein.-con. Public LIBRARY, Burrard and Robson Sts., VANCOUVER, B. C. City, City Hall, Vancouver, B. C. Bids Mar. 29, awarded Apr. 11. CD 3/2.

▲ **North York Bd. Educ.,** 7 Kenneth St., Willowdale, Ont., cancelled Nov. 14 bids, York Mills Collegiate INSTITUTE, TORONTO, ONT. **$1,000,000.** Plans being revised. CD 10/31.

▲ **A. Deslauriers & Fils Ltee,** 268 Lalement St., Quebec City, Que., CA, **$1,000,000.** PRINTING PLANT exten., 1 de la Couronne St., QUEBEC CITY, QUE. LeSoleil, 1 rue de la Couronne, Quebec City, Que. CD 3/5.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲ Bids are being taken on the following project under international competitive bidding of NATO.

FRANCE

Secretariat d'Etat a l'Industrie et au Commerce, Service Special des Depots d'Hydrocarbures, 85 Boulevard Montparnasse, Paris, supply and installation of 30,000 meters of unwelded pipes of 12 in. diameter, 4,000 meters of unwelded pipes, 6, 8 and 10 in. diameter. Est. $1,257,143. Firms interested in bidding should apply for invitation to bid by May 4. Deadline for submitting bids is May 23. A brochure describing the NATO international competitive bidding program may be obtained from the Commercial Intelligence Division or from any Department of Commerce Field Office.

▲ Bids are being taken on the following project under international competitive bidding of NATO.

ITALY

Ministero Difesa-Aeronautica, Direzione Generale Demanio, Ufficio Studi, la Sezione, Viale Castro Pretorio, Rome. NATO infrastructure Proj. No. 032, constr. sea terminal for POL installations at La Spezia harbor. est. $1,350,000. Firms interested in bidding should apply for invitation to bid by April 20. Bids asked about May 30. A brochure describing the NATO international competitive bidding program may be obtained from the Commercial Intelligence Division or from any Department of Commerce Field Office.

PROPOSED PROJECTS

WATER SUPPLY

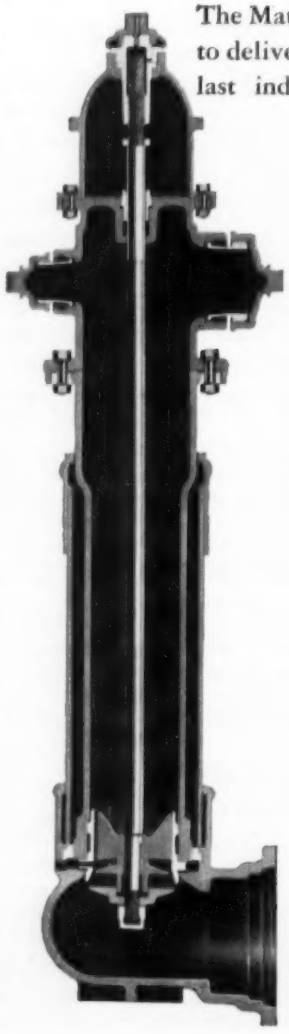
▲ **Mich., Adrian**—City, WW program, incl. filtration plant expansion, pumping station and force main, etc. **$1,750,000.** Finkbeiner, Pettis & Strout, 518 Jefferson St., Toledo, O., consult. engrs.

▲ **Neb., Lincoln**—City, City Hall, constr. addnl. wells at Ashland Pumping Station, a purification plant. **$2,500,000.** Carl Fisher, city engr. CD 5/12/53.

SEWERS, WASTE DISPOSAL

▲ **Ill., Springfield**—City, City Hall, voted $3,200,000 bonds, sewerage system, incl. enlarging sewage plant. Charles Nelson, city engr. CD 3/9.

Reduce Wear, Save with Mathews



The Mathews Flange Barrel Hydrant is designed to deliver every available gallon of water and to last indefinitely with minimum maintenance.

CHECK THESE IMPORTANT FEATURES

The Flange Barrel

The swivel flange at the base of the nozzle section permits nozzles to be faced toward any point in the complete circle. Saves time on original installation and on replacements.

On broken hydrants, top cap and nozzle sections can usually be salvaged, thus reducing accident costs.

The Stuffing Box Plate

Cast integral with the nozzle section, the plate keeps water and sediment away from the operating thread. Hydrant remains operable in any weather. Wear on the operating thread is largely eliminated.

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Available with mechanical joint pipe connections.

▲ **O., Cleveland**—City, Dpt. P. Service, Louis L. Drasler, dir., City Hall, Zone 14, Ridge Rd. incinerator. $1,500,000. Adache Eng. Co., Old Arcade, Zone 14, consult. engrs. CD 1/12.

▲ **Wash., Parkland**—Parkland Sewer Comn., Parkland, bond election June 2, 8 mi. 18-in. trunk sewers, collection system and disposal plant. $2,000,000.

STREETS AND ROADS

▲ **Calif., San Rafael**—Marin Co., c/o clerk, Court House, $7,500,000 bond election Nov. 6, imprv. county roads. CD 9/14.

▲ **Fla., Clearwater**—Pinellas Co., Court House, toll road and bridges, incl. 3.96 mi. between St. Petersburg and Long Key; 2.99 mi. on Mullet Key, 3.09 mi. to connect with Sunshine Skyway, $8,688,000. J. E. Greiner Co., 1106 N. Charles St., Baltimore, Md., preliminary engineering study. Coverdale & Colpitts, 120 Wall St., New York, N. Y., made traffic and earnings survey. CD 5/6/55.

▲ **Mich., Mount Clemens**—City, City Comrs., imprv. city streets by paving. $2,500,000. Edward E. Whedon, asst. city engr. CD 5/6/54.

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15, **Summit Co.**—Expressway from end of existing Akron Expressway north to Graham Rd., Cuyahoga Falls, $13,752,000. Beiswenger & Hoch, 661 W. Market St., Akron, consult. engrs.

Summit, Portage and Mahoning Counties—relocating Rte. 18 from Akron Expressway to Niles-Youngstown Turnpike Interchange; 4.92 mi. Jackson Sect. $2,711,000; 3.94 mi. Milton Sect., $3,033,000; 4.58 mi. Palmyra Sect. $2,575,000; 4.36 mi. Edinburg Sect. $2,469,000; 3.98 mi. Rootstown Sect. $2,008,400, Beiswenger & Hoch, 661 W. Market St., Akron; and John Glancy & Assoc., 4326 Market St., Youngstown, consult. engrs.

▲ **Wash., Seattle**—City, County-City Bldg., Zone 4, extension of Empire Way from Dearborn St. to Lake Washington canal. $2,317,000. Bids for first section, from Dearborn to Cherry St. to be called late this year or early next year. W. E. Parker, city engr.

EARTHWORK, WATERWAYS

▲ **California**—Pacific Gas & Electric Co., 245 Market St., San Francisco, Zone 6, 113,000 kw. Belden Power house at Yellow Creek on Feather River. $25,800,000. Construction not scheduled.

▲ **California**—Pacific Gas & Electric Co., 245 Market St., San Francisco, Zone 6, Butte Valley Powerhouse at Butte Valley reservoir with 2 mi. 13 ft. concrete lined tunnel and 6,700 steel penstock pipe to convey water from Lake Almanor to plant, Caribou 2 Powerhouse with 1.75 mi. tunnel 12 ft. diam. and 2,400 ft. penstock to carry water from Butte Reservoir to plant. 150 ft. high afterbay dam will be constructed. Access roads will be constructed. Both jobs as part of Feather River Proj. $32,600,000.

▲ **Conn., Danbury**—City, voted $1,500,000 bonds, flood control.

AIRPORTS

▲† **N. Y., Rome**—POL FACILITIES—U. S. Eng., 111 E. 16 St., New York, Zone 3, plans by Greenberg & Ames, 303 Fourth Ave., New York, Zone 10, POL Facilities, at Griffis Air Force Base. $1,000,000-$3,000,000. CD 10/19.

LATIN AMERICA

▲ **Mexico**—HEALTH CENTERS—Srita. de Salubridad, Dr. Ignacio Morones Prieto, Sec. Mexico City, plans health centers, various sects. of Mexico. $1,100,000.

PUBLIC BUILDINGS

▲ **Calif., Los Angeles**—ADMINISTRATIVE FACILITY—Los Angeles Co., Hall of Records, plans by Walker, Kallonzes & Klingerman & Lunden, Hayward & O'Connor, 488 S. San Vicente Blvd., road dept. administrative facility, testing laboratory, $3,000,000.

▲ **Calif., Ventura**—SCHOOLS—Ventura High School Dist., voted $9,500,000 bonds Apr. 10, two Junior High Schools, Senior High School, 4 new bldgs. on Ventura College campus, school addns. CD 2/17.

▲ **Conn., Danbury**—INSTITUTE—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Lyons & Mather, 211 State St., Bridgeport, Henry Abott Regional Technical Institute. $2,333,000. P. J. Carroll, c/o owner, engr. CD 3/29.

▲ **Conn., Middletown**—INTENSIVE TREATMENT—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Walter Crabtree Jr., 195 Fern St., West Hartford, 4 story, central structure with 5 wings, cinder block, brick intensive treatment bldg. $4,000,000. John P. Legnos, 30 Gillett St., Hartford, consult. engr. CD 2/9/55.

▲ **Kan., Topeka**—SCHOOL—Bd. Educ., 415 W. 8 St., plans by O. D. Howells & Assoc., Carlinghouse Bldg., Margaret Hill McCarter School, $6,000,000.

▲ **Mich., Houghton**—APARTMENTS—State, A. N. Langius, dir. State Bldg. Dpt., Lewis Cass Bldg., Lansing, plans by Ralph A. Calder, 1212 Kales Bldg., Detroit, Zone 26, apartments, 99 units for married students, $2,100,000; dormitory, $1,200,000, Michigan State College of Mining and Technology. CD 12/12.

▲ **Mich., Kalamazoo**—DORMITORY—State, A. N. Langius, dir. State Bldg. Dpt., Lewis Cass Bldg., Lansing, plans by Ralph R. Calder, 1212 Kales Bldg., Detroit, Zone 26, dormitory facilities, $3,000,000; apartments for married students, $1,000,000, Western Michigan College of Education. CD 9/8/53.

▲ **Mich., Mount Pleasant**—DORMITORY, etc.—State, A. N. Langius, dir. State Bldg. Dpt., Lewis Cass Bldg., Lansing, plans by Roger Allen & Assoc., 1126 McKay Bldg., Grand Rapids, dormitory, $2,400,000; apartments for married students, $1,400,000, Central Michigan State College of Education. CD 9/20.

▲ **Mich., Waterford**—SCHOOL—Waterford Twp. Bd. Educ. plans by George D. Mason & Co., 409 Griswold St., Detroit, Zone 26, Junior High School. $2,000,000. CD 3/12.

▲ **Minn., Austin**—SCHOOL—Bd. Educ., S. L. Coumbe, clk, $4,400,000 bond election May 15, Junior High School, $2,000,000; elementary school, $600,000, three smaller schools. Hammel & Green, 1932½ University Ave., St. Paul, archts. CD 12/22.

▲ **Neb., Kearney**—SCHOOL—Bd. Educ., Kearney, $2,250,000 bond election May 14, schools. CD 11/11.

▲ **N. J., Paramus**—SCHOOL—Bd. Educ. plans by Lawrence Licht, 19 Knickerbocker Rd., Englewood, high school. $2,813,000. CD 1/23/47.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, Zone 7, plans by Brown & Guenther, 1860 Broadway, Zone 23, James Monroe Houses (city) at Lafayette and Beach Aves., Proj. NYC-31, $4,800,000. CD 11/17.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, Zone 7, plans by Greenberg & Ames, 303 Fourth Ave., Zone 10, housing, Forest Houses South (federal), Proj. NY-5-31, $7,875,000. CD 6/22.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, Zone 7, plans by Lama, Proskauer & Prober, 395 Pearl St., Brooklyn, Zone 1, Samuel Gompers Houses (federal) Proj. NY-5-32, $7,000,000. CD 6/22.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, Zone 7, plans by Greenburgh & Ames, 303 Fourth Ave., Zone 10, Forest Houses south of 161 St. and Tinton Ave., (city), Proj. NYC-30, $4,800,000. CD 9/28.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, New York, Zone 7, plans by Lama, Proskauer & Prober, 395 Pearl St., Brooklyn, Zone 1, Samuel Gompers Houses (city) Proj. NYS-29, $12,800,000. CD 11/16.

▲ **N. Y., New York**—HOUSING—New York City Housing Auth., 299 Broadway, Zone 7, plans by Brown & Guenther, 1860 Broadway, New York, Zone 23, James Monroe Houses (federal), Bruckner Blvd. and Taylor Ave., Proj. NY-5-36, (formerly Classon Point II houses), $14,250,000. CD 6/22.

▲ **N. Y., West Seneca**—SCHOOL—West Seneca Central School, bond election May 8, Junior High School. $2,557,000. CD 9/22/48.

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Optional feature furnished at extra cost. Specially designed flange in the standpipe just above ground level and a frangible coupling in the hydrant stem are designed to snap when struck a blow heavy enough to break the hydrant. Both can be replaced quickly *and without excavating*, while hydrant head, standpipe and stem remain undamaged.

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▲ **O., Kettering**—HIGH SCHOOL—Bd. Educ., Kettering, plans by Rial T. Parrish, Knott Bldg., Dayton, high school, unit type, north of present Fairmont High School, 3 academic units. $3,000,000. Bids in 1957. CD 11/14.

▲ **Tex., Houston**—SCHOOLS—Houston Independent School Dist., 1300 Capitol St., bond election June 2. Junior High Schools, Durkee area, $2,250,000; Section 3 of Meyerland, $2,000,000; E. O. Smith area, $2,500,000; in Tanglewood, $2,500,000. Senior High Schools, Burrus Senior High School, $3,100,000; Oates-Whittier senior high school, $2,750,000; Westheimer and Ulrich Rds. $1,750,000; White Oak Bayou-34th St. area, $1,875,000; Elementary Schools, Blackshear area, $1,000,000; Blueridge area, $750,000; Briargrove area, $1,100,000; Gloverland area, $650,000; Dogan area north, $675,000; Glenbrook Valley area, $775,000; Inwood Terrace area, $1,250,000; Lamar Terrace, $1,050,000; Meadowcreek area, $975,000; Section 2 Meyerland area, $1,200,000; Rusk area, $800,000; Sunnyside area, $900,000; Willow Bend area, $1,250,000. CD 11/1.

▲ **Vt., Burlington**—MEDICAL—University of Vermont & State Agricultural College, Carl W. Borgmann, pres., 85 South Prospect St., plans by Skidmore, Owings & Merrill, 575 Madison Ave., New York, N. Y., and Freeman, French & Freeman, 158 Bank St., medical bldg. $5,000,000.

▲ **Wis., Madison**—DORMITORY, etc.—University of Wisconsin, Madison, plans by R. C. Kirchhoff, state archt., two men's dormitories, $2,000,000; 100-family married students apartment bldg., $892,000.

▲ **Alta., Calgary**—INSTITUTE—Alberta Govt., Parliament Bldgs., Edmonton, 2 story, rein.-con. brick veneer department of Provincial Institute of Technology & Art building on University campus. $2,500,000.

COMMERCIAL BUILDINGS

▲ **Calif., Amaheim**—DWELLINGS—Amethyst Builders, 8021 E. Rome Ave., 262 frame, stucco dwellings, Tracts 2874, 2875 and 2876. $2,750,000.

▲ **Calif., Burlingame**—APARTMENTS—Jack Glang, 1500 Adeline Dr., apartments, 360 units, $4,000,000.

▲ **Conn., Wallingford** — SHOPPING CENTER — Fusco-Amatruda Co., 59 Amity Rd., New Haven, shopping center. $2,000,000.

▲ **D. C., Wash.**—SEMINARY—Westminster Theological Seminary, campus of American University, Mass. and Nebraska Aves. N. W., plans by Hensel Fink, 1701 Arch St., Phila., Pa., quadrangle type bldg. on campus of American University. $2,500,000.

▲ **Mich., Grand Rapids**—OFFICE—C. A. Sarafis & James Bronkema, 1329 Fulton St. E., 12 story, steel, masonry office, incl. garage. $5,000,000.

▲ **N. Y., New York**—APARTMENT—Edgar J. Levy & Assoc., c/o H. I. Feldman, 415 Lexington Ave., New York, Zone 17, 18 story apartment, Second Ave. and 51 St. $3,000,000.

▲ **O., Akron**—SHOPPING CENTER—M. DeBartolo Constr. Co., Edw. DeBartolo, pres., 2620 Market St., Youngstown, 28 unit shopping center, S. Arlington St. $2,500,000.

▲ **O., Parma**—SHOPPING CENTER—Zehman-Wolf & Sherman Constr. Co., 13484 Cedar Rd., Cleveland, Zone 18, plans by Weinberg & Teare, Citizens Bldg., Cleveland, Zone 14, 150,000 ft. shopping center, Snow and Broadview Rds. $5,000,000. Bids in late fall. CD 11/18.

▲ **O., Pepper Pike**—COLLEGE BLDGS.—Ursuline College, 2234 Overlook Rd., Cleveland, Zone 6, plans by D. A. Bohlen & Sons, State Life Bldg., Indianapolis, Ind. college on 80-acre site, incl. classroom, student union, gymnasium and other bldgs., Lander Rd. and Fairmont Blvd. $7,000,000.

▲ **Pa., Phila.**—APARTMENT, etc.—Matthew K. Stevens, Lewis Tower Bldg., apartment, 400 units, garage, seven stores and shops. $4,000,000-$5,000,000.

▲ **Pa., Wayne**—RESIDENTIAL DEVELOPMENT—Arwyn, Inc., c/o A. D. Warnock, Suburban Square Bldg., Ardmore, residential development, King of Prussia Rd. $5,000,000.

▲ **Tex., Dallas**—OFFICE—Braniff International Airways, c/o Charles E. Beard, 3309 Roanoke St., plans by Lane, Gamble & Assocs., 2520 W. Mockingbird Lane, 10 story, 200,000 sq. ft. cast stone facing with welded-steel structure office. $2,000,000. R. Marvin Shipman, 146 W. Olmos Dr., San Antonio, consult. engr. CD 2/13.

▲ **Tex., San Antonio**—SHOPPING CENTER—L. R. Pletz, Developer, South Texas Bldg., plans by Marmon-Mok Assocs., South Texas Bldg., 230,000 sq. ft. shopping center, 20-acre tract Austin Hy. adjoining Terrell Heights, opposite Terrell Hills, $2,000,000.

▲ **Wash., Tacoma**—HOUSING—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, construct and finance 950 housing units, McChord Air Force Base, $10,000,000. Plans by Durham, Freed & Anderson, 1.00 Denny Way, Seattle, Wash., for first 150 units. CD 4/27/55.

▲ **Ont., Toronto**—APARTMENTS—Elias Rogers Co. Ltd., 1176 Yonge St., plans by Harry B. Kohl, 1407 Yonge St., six 13 or 14 story, two with 153 suites each, rest 142 suites each apartment bldgs., Lascelles Blvd. north of Gormley Ave. $4,096,000.

▲ **Que., Charlesbourg**—SHOPPING CENTER—Ivanhoe Corp., 5400 Hochelaga St., Montreal, plans by Eliasoph & Berkowitz, 6931 Cote des Neiges Rd., Montreal, 30-store shopping center $2,500,000. CD 11/22.

▲ **Que., Montreal**—OFFICE—Bank of Montreal, 119 St. James St. West, plans by Barott, Marshall, Montgomery & Merrett, Canada Cement Bldg., 17

story, 60x200 ft., structural steel, concrete slab, stone office, $10,000,000. L. Schecter, c/o archt., consult. engr.

INDUSTRIAL BUILDINGS

▲ **Ala., Mobile**—PLANT—Alabama Power Co., Alabama Power Bldg., Birmingham, double capacity of Barry Steam Plant, north of here, $25,000,000.

▲ **California**—TURBINE GENERATOR—Pacific Gas & Electric Co., 245 Market St., San Francisco, Zone 6, second turbine-generator at Humboldt Bay Power Plant. $7,500,000.

▲ **Ind., Boonville**—PLANT—Aluminum Co. of America, 1200 Alco Bldg., Pittsburgh, 19, Pa., 150,000 ton primary aluminum reduction plant incl. ingot casting equip., carbon plant, machine and electric shops, office, 375,000 kw. steam power plant and docking facilities in Warrick county near here. $80,000,000.

▲ **Ind., Whiting**—RESEARCH AND OFFICES—Standard Oil Co. of Indiana, 129 and Indianapolis Blvd., (a) 2 technical office bldgs. (b) 2 research bldgs. $4,000,000.

▲ **N. J., Atlantic City**—PLANT—Atlantic City Electric Co., 1600 Pacific Ave., 75,000 kw. turbo-generating plant. $6,000,000.

▲ **N. J., Hackettstown**—PLANT—Hawley & Hoops, Inc., 200 N. 12 St., Newark, plans by Walter Kidde Constructors, Inc., engr.-archt., 57 Bergen St., Newark, plant, $2,000,000-$3,000,000.

▲ **O., Brooklyn**—PLANT—American Greetings Corp., 1328 W. 78 St., Cleveland, Zone 2, 1,500,000 ft. plant space, 160,000 ft. office space, initial bldg. will have approx. 500,000 sq. ft. Total est. $19,000,000. Austin & Co., 16112 Euclid Ave., Cleveland, Zone 12, consult. engrs. CD 11/22.

▲ **O., Piqua**—PLANT—Pioneer Rural Electric Co-operative, 202 N. Downing St., generating plant adjoining present municipal power plant, $3,500,000.

▲ **O., Sidney**—FACTORY—Copeland Refrigeration Corp., Clinton and Thomas Sts., 1 story, 250,000 sq. ft. factory addn. for refrigeration and air-conditioning compressor mfg., engineering research and product development, $2,000,000.

▲ **Ont., Fort Williams**—PLANT EXPANSION—Abitibi Power & Paper Co. Ltd., Fort William, plant expansion program. $22,000,000.

▲ **Ont., Manitouwadge**—MINE PROJECT—Willroy Mines Ltd., 25 Adelaide St. W., Toronto, mine project, incl. mill with 750-ton initial capacity, $5,500,000. General Eng. Co. Ltd., 100 Adelaide St. W., Toronto, consult. engr.

▲ **Ont., Peterborough**—PLANT EXPANSION—Outboard Marine & Manufacturing Co. of Canada Ltd., Monaghan Rd., plans by A. G. Facey, 991 Bay St., Toronto, plant expansion, $2,000,000. Edgar A. Cross & Assocs., 991 Bay St., Toronto, consult. engrs. CD 3/21.

▲ **Sask., Beaverlodge**—ORE MILL—Lorado Uranium Mines Ltd., 171 Yonge St., Toronto, Ont. 750 to 1,000-ton uranium ore mill. $7,000,000-$8,000,000. Kilborn Eng. (1954) Ltd., 36 Park Lawn Rd., Toronto, Ont., consult. engrs. J. S. Carman, c/o owner, ch. engr. CD 9/26.

UNCLASSIFIED

▲ **California**—UNDERGROUND GAS STORAGE—Pacific Gas & Electric Co., 245 Market St., San Francisco, Zone 6, converting gas field into undergraund gas storage area near Winters, $3,000,000.

▲ **Ill., Chicago**—HARBOR—Chicago Park District, 425 E. 14 St., Zone 5, new harbor for pleasure boats. $5,000,000.

▲ **Iowa**—RURAL DISTRIBUTION LINES—Eastern Iowa Light & Power Co-operative, Wilton Junction, 150 mi. rural distr. lines, transmission lines, new tie line, conversion of 177 mi. existing line, 2 substations, Muscatine Co. $1,265,000. Stanley Eng. Co., Hershey Bldg., Muscatine, consult. engr. CD 4/17.

▲ **Iowa**—RURAL DISTRIBUTION LINES—Eastern Iowa Light & Power Co-operative, Wilton Junction, 150 mi. rural distr. lines, 4 mi. 69KV transmission line, sub-stations and sys. imprvs., Scott Co. $1,265,000.

▲ **Massachusetts**—BEACH DEVELOPMENT—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, plans by Child, Lawrence & Shannon, 711 Boylston St., Boston, Scusset Beach Development, Bourne and Sagamore, $1,000,000. Sasaki & Novak, 117 Galen St., Watertown, landscape archts. CD 3/9/55.

▲† **New York**—NATIONAL GUARD FACILITIES—U. S. Eng., 111 E. 16 St., New York, Zone 3, plans by Custom Engineering, 114 Liberty St., New York, Zone 7, National Guard Facilities at AAA Facilities, in New York and Niagara Areas, $1,000,000-$3,000,000.

▲ **Tex., San Angelo**—COLISEUM—City, Coliseum. $1,000,000. CD 2/15.

▲ **Virginia**—TUNNEL—Elizabeth River Tunnel Comn., Berkeley Plaza, Norfolk, 2nd Tunnel from Norfolk to Portsmouth. $15,000,000-$20,000,000. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York 6, N. Y. consult. engrs. CD 3/30.

▲ **New Brunswick and Prince Edward Island**—CAUSEWAY—Dpt. Transport, Hunter Bldg., Ottawa, Ont., and Prince Edward Island Dpt. P. Wks. & Hys., Parliament Bldgs., Charlottetown, P. E. I., causeway across Northumberland Strait to link Prince Edward Island with New Brunswick mainland, rock fill, $40,000,000; navigational dock, $5,500,000; lock gates, $1,500,000; administration bldg., $60,000; railroad, $1,000,000. O. J. McCulloch & Co., 45 Westminster Ave. S., Montreal, Que., consult. engrs. CD 12/1/43.

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HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

May 7 Connecticut, Massachusetts

HEAVY CONSTRUCTION—LB & CA

▲† **Frederick J. Raff Co.**, 271 Sheldon St., Hartford, Conn. LB $1,552,036. imprv. steam plant second increment, Charlestown, NOy 90056, Spec. 48802, BOSTON, MASS. Dist. P. Wks., IND, 495 Summer St., Boston, 10, Mass. Bids Apr. 24. CD 3/8.

BUILDINGS—LB & CA

▲ **Morton C. Tuttle Co.**, Park Square Bldg., Boston, Mass. CA Est. $2,600,000. 260,000 sq. ft. FACTORY addn., First St., LEOMINSTER, MASS. Cluett Peabody & Co., Inc., First St., Leominster, Mass. Morton C. Tuttle Co., Park Square Bldg., Boston, Mass., engr.

▲ **MacMillin Co., Inc.**, 28 Mechanic St., Keene, N. H. CA Approx. $1,117,300. GYMNASIUM, swimming pool, etc. addn., alterations, NORTHFIELD, MASS. Mount Herman School, Admin. Bldg., Northfield, Mass. Campbell & Aldrich, 38 Newbury St., Boston, Mass., archts. CD 9/26/51.

▲ **Stone & Webster Eng. Corp.**, 49 Federal St., Boston, Mass. CA $19,500,000. design and construct POWER PLANT addn., SOMERSET, MASS. Montaup Electric Co., 85 N. Main St., Fall River, Mass.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 8 Maryland — May 10 New Jersey & Pennsylvania
May 10 New York

STREETS AND ROADS

May 8 Maryland — May 15 New Jersey

▲† **New York**—SPECIAL AAA FACILITIES—BA On Or About 5/29—U. S. Eng., 111 E. 16 St., New York, Zone 3, constr. Special AAA Facilities at Amityville, ENG-30-075-56-15. $1,000,000-$1,250,000. Plans deposit $100. CD 7/19/55.

BUILDINGS—BA

▲ **Md., Frederick**—SCHOOL—BA 5/8—Frederick Co. School Bd., 115 E. Church St., 1, 2 and 3 story masonry Frederick Junior High School, $1,000,000. Plans deposit $35, Hopkins, Pfeiffer & Fenhagen, 10 E. Mulberry St., Baltimore, Zone 2, archts. CD 3/8.

▲ **Pa., Wilkes-Barre**—INSTITUTION—BA 5/17—General State Auth., 18 and Herr Sts., Harrisburg, institution for defective delinquents, incl. power plant, sewage sys., water distr. $9,000,000. Plans deposit $100. Extended date. Alfred Hopkins Assoc., 292 Madison Ave., New York 17, N. Y., and Lacy, Atherton & Davis, Hotel Sterling, Wilkes-Barre, archts. CD 3/28.

▲ **Pa., Phila.**—OFFICE—BA 5/23—General State Auth., 18 and Herr Sts., Harrisburg, 18 story, masonry, state office bldg., Broad and Spring Garden Sts. $8,000,000. Plans deposit $100, Collaborating Architects (Charles Ward, 1621 Chestnut St., and Carroll Grisdale & Van Allen, assoc. archts., 204 W. Rittenhouse Square), 1621 Chestnut St., Phila., Zone 3, archts. A. F. Jones, ch. engr. CD 9/15/54.

HEAVY CONSTRUCTION—LB & CA

▲ **Hendrickson Bros., Inc.**, 63 N. Central Ave., Valley Stream, N. Y. CA $1,464,075. lateral sewers in Elmont and vicinity town of Hempstead, Proj. 1002-2-FP-3, MINEOLA, N. Y. County Executive, Nassau Co., Old County Court House, Mineola, N. Y. CD 4/13, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,
James Julian, Inc., Elsmere, Del. CA $1,999,267, divided hy. 5.21 mi., 24 ft. wide on each side of concrete earth divisor, Rte. 22, between Hamburg and Lenhartsville, Berks Co. CD 4/12, under LB.

▲ **Brooklyn Eng. Corp.**, 1100 E. 25 St., Baltimore 18, Md. CA $1,414,250. Calvert St. Bridge over Main lines of P.R.R., part of Jones Falls Expressway, BALTIMORE, MD. City, Bureau Hys., 303 Municipal Bldg., Baltimore 2, Md. CD 4/6, under LB.

BUILDINGS—LB & CA

▲ **C. E. Youngdahl & Co., Inc., and Pstay & Fuhrman, Inc.**, 369 Lexington Ave., New York 17, N. Y. CA $13,696,000 (6 bidders) foundations and general constr. for Frederick Douglass HOUSES, Proj. No. NYS 64-1, located in area bounded generally by W. 104 St., Manhattan Ave., W. 100 St. and Amsterdam Ave., Manhattan Boro, NEW YORK, N. Y. New York City Housing Auth., 299 Broadway, New York 7, N. Y. Grand total $18,884,620. CD 3/27, under LB; **Jarcho Bros., Inc.**, 38-18 33 St., Long Island City, N. Y. CA $1,207,677 (4 bidders) heating and ventilating work; CA $1,997,900 (6 bidders) plumbing work (New York, N. Y.);
Herman H. Schwartz, Inc., 179 S. Portland St., Brooklyn 17, N. Y. CA $1,309,470 (6 bidders) electrical work (New York, N. Y.);
Otis Elevator Co., 260 11 Ave., New York, N. Y. CA $673,573, elevators (New York, N. Y.).

▲ **200 E. 36 St. Corp.**, c/o H. I. Feldman, archt., 415 Lexington Ave., New York 17, N. Y. Owner Builds. $2,500,000. 19 story, 74x125 ft. APARTMENT, 36 St. and Third Ave., NEW YORK, N. Y.

▲ **Sam Minskoff & Sons**, 521 Fifth Ave., New York 17, N. Y. Owner Builds. $6,000,000. 34 story, 150x225 ft. OFFICE, Lexington Ave. and 51 St., air-conditioned, off-street loading facilities, 575 Lexington Ave., NEW YORK, N. Y. Sylvan & Robert L. Bien, 33 W. 46 St., New York, N. Y., archts. CD 1/9.

▲ **Dawson Brothers Constr. Co., Inc.**, 329 W. Water St., Syracuse, N. Y. CA general constr. branch WAREHOUSE and OFFICE, SYRACUSE, N. Y. Total est. cost $2,000,000. Allis-Chalmers Mfg. Co., 935 E. Hiawatha Blvd., Syracuse, N. Y. Edgarton & Edgarton, Architect-Engineer Assocs., Marine Midland Bldg., Syracuse, N. Y., engrs.-archts. Lloyd B. Knutsen, 1933 Elmbrook Lane, Pittsburgh 16, Pa., assoc. archt.;
H. R. Halliday, Syracuse, N. Y. CA plumbing work (Syracuse, N. Y.);
Randall Electric Co., 1007 E. Fayet St., Syracuse, N. Y. CA electrical work (Syracuse, N. Y.);
Kermit A. Taylor, Inc., New Court Ave., Syracuse, N. Y. CA heating and air conditioning work (Syracuse, N. Y.).

▲ **Clarence Sprinkle**, Lakewood, N. J. Separate Contracts. $1,950,000. 106-unit RESIDENTIAL DEVELOPMENT, LAKEWOOD, N. J. Charles B. Carman, 68 Linden Ave., Metuchen, N. J., archt.

▲ **Jack Epstein**, 12 Longwood Rd., South Orange, N. J. Owner Builds. $1,000,000. 76 split-level HOMES, Wayside Rd., NEPTUNE TWP., N. J. Erwin Gerber, 11 Commerce St., Newark, N. J., archt.

▲ **Morey Brothers**, 300 E. Wildwood Ave., Wildwood, N. J., CA $16,000,000. 900-unit RESIDENTIAL DEVELOPMENT and SHOPPING CENTER, WILDWOOD CREST, N. J. Diamond Beach Development Co., 5380 Pacific Ave., Wildwood Crest, N. J. Cochram-Stephenson & Wing, 925 N. Charles St., Baltimore, Md., archts.

▲ **Nason & Cullen, Inc.**, 6522 Vine St., Phila., Pa. CA $1,000,000. CLUB HOUSE, swimming pool, tennis courts, etc., GLADWYNNE, PA. Phila. Country Club, West Fairmount Park, Phila., Pa. Nolen & Swinburne, 1649 N. Broad St., Phila., Pa., archts. CD 9/28, under CA.

▲ **Pinebrook Constr. Co.**, 820 Cottman St., Phila., Pa. Separate Contracts. $4,150,000. RESIDENTIAL DEVELOPMENT, 500 units, Bradford St., PHILA., PA.

▲ **Charles Litman & Son**, 8121 Heacock St., Wyncote, Pa. Separate Contracts. $2,000,000. RESIDENTIAL DEVELOPMENT, 111 units, Newtown Rd., WARMINSTER, PA. C. Frederick Wise, 101 Charles Dr., Bryn Mawr, Pa., archt.

▲ **A. Stanley Ezekiel**, 601 Morgan Ave., Drexel Hill, Pa. Separate Contracts. $2,000,000. RESIDENTIAL DEVELOPMENT, one hundred 2 story brick veneer, concrete block units, Norris Park, WEST CHESTER, PA. George Hay, Media, Pa., archt.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 11 Kentucky, Tennessee — May 24 Florida

STREETS AND ROADS

May 9 Louisiana — May 11 Kentucky, Tennessee

BUILDINGS—BA

▲ **Va., Portsmouth**—HIGH SCHOOL—BA 5/11—Portsmouth School Bd., City Hall, Clarke Junior High School. $1,000,000. J. Binford Walford & O. Pendleton Wright, 103 E. Cary St., Richmond, archts. CD 12/10/54.

▲ **Ala., Birmingham**—RESIDENCE HALL, etc.—BA 5/17—Bd. Trustee Howard College, Lakeshore Dr., Zone 9, brick, stone women's residence hall on new campus at Homewood, $1,000,000; mens' residence hall on new campus at Homewood, $1,000,000. Plans deposit $25 each. Van Keuren, Davis & Co., 3004 7 Ave. S., archts. CD 2/17.

▲ **Fla., Eglin Air Force Base**—HOUSING—BA 5/29—Base Procurement Office, Bldg. NR-358, Eglin Air Force Base, construct and finance armed services housing, incl. 500-units, Elgin Air Force Base, INV-08-603-56-562, $2,000,000-$3,000,000. Plans deposit $100. CD 4/19.

HEAVY CONSTRUCTION—LB & CA

▲† **McLean Contg. Co.**, 2405 Kimball Terrace, Norfolk, Va., LB $2,169,717, bulkhead, breakwater, Naval Base NOy 91412, Spec. 48316, NORFOLK, VA. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. Bids Apr. 12. CD 4/18, under LB.

▲† **Southern Constr. Co., Inc.**, Daniel Field, Augusta, Ga., CA $1,081,790. 3 dormitories, Brookley Air Force Base, ENG-01-076-56-38, MOBILE, ALA. U. S. Eng., 2301 Grant St., Mobile, Ala. Bids Jan. 24, awarded Apr. 20. CD 2/1, under LB.

▲ **LOUISIANA**—Mississippi River Bridge Auth. of the State of La., 422 City Hall, New Orleans, Boh Bros. Constr. Co., 2400 Cypress St., New Orleans, La. CA $1,201,251 Contr. 7; CA $1,334,264 Contr. 8, substructures of New Orleans and Algiers approach viaducts for Greater New Orleans Bridge over Mississippi River at New Orleans. Bids Mar. 27. awarded Apr. 16. CD 4/4, under LB.

BUILDINGS—LB & CA

▲ **Frank J. Rooney,** 5880 N.E. 4 Ave., Miami, Fla., LB $1,037,787, Kenilworth HOUSE, 102 St. and Collins Ave., BAL HARBOUR VILLAGE, FLA. The Kenilworth Hotel Inc., 10205 Collins Ave., Bal Harbour Village, Fla. Bids Apr. 17. CD 4/11.

▲ **R. P. Farnsworth & Co., Inc.,** 1515 S. Salcedo St., New Orleans, La. CA $3,000,000. 17 story OFFICE, PARKING GARAGE, 812-24 Gravier St., NEW ORLEANS, LA. Gravier Improvement Co., Inc., Queen & Crescent Bldg., New Orleans, La. Nolan, Norman & Nolan, Queens & Crescent Bldg., New Orleans, La., engrs. Awarded Apr. 17.

▲ **Virginia Engineering Co.,** 25 St. and James River, Newport News, Va. CA Est. $3,000,000-$4,000,000. IRON FOUNDRY for enameled ware, LOUISVILLE, KY. American Radiator & Standard Sanitary Mfg. Co., Seventh and Shipp Sts., Louisville, Ky. CD 4/5.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 8 Wisconsin — May 9 Michigan

STREETS AND ROADS

May 8, 9 Michigan — May 8 Wisconsin

May 15, 22 Ohio

BUILDINGS—BA

▲ **Wis., Green Bay**—WAREHOUSE—BA 5/9—Super Value Stores, Inc., 101 Jefferson St., Hopkins, Minn., 1 story, 156x322 ft., concrete, steel, brick, block, cut stone warehouse, $1,000,000. R. W. Surplice, 131 Main St., Green Bay, assoc. archt. Magney, Tusler & Setter, Roanoke Bldg., Minneapolis, Minn., archts. CD 1/20.

▲ **Mich., Garden City**—SCHOOLS—BA 5/15—City, Pub. Schools, 29128 Dover St., addns. to Lathers, Memorial, Marquette, Farmington, Maplewood, H. Ruff, North Douglas and South Douglas Elementary Schools. $1,500,000. Plans deposit $160 or $20 per proj., W. T. Anicka & Assoc., 2300 Washtenaw St., Ann Arbor, archts. CD 2/28.

BUILDINGS—SLC

▲ **Mich., Port Huron**—Y. M. C. A. BLDG.—Young Men's Christian Assn., C. G. Wood, genl. secy., 937 Sixth St., soon lets contract excavation and piling work for Y.M.C.A. bldg. Total est. $1,250,000. soon lets contract. Wyeth & Harman, Inc., 1602 Military Ave., archt. Raymond Covey, 626 Michigan Bldg., Detroit, Zone 26, struct. engr. CD 2/16/54.

HEAVY CONSTRUCTION—LB & CA

▲ **Foley Constr. Co.,** 5050 Orchard St., Cincinnati, O. CA $1,282,540, est. $1,640,306, Sect. 3, East Branch of Ohio River Interceptor, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Apr. 17, awarded Apr. 20. CD 4/20, under LB.

▲ **Michael J. McDermott & Co.,** 30 N. La Salle St., Chicago, Ill., LB $1,612,679 railroad underpass, CHICAGO, ILL. City, City Hall, Chicago, Ill. CD 12/2/53.

BUILDINGS—LB & CA

▲ **Frank Messer & Sons, Inc.,** 4612 Paddock St., Cincinnati, O., LB $1,090,000. (2 bidders) SHOPPING CENTER, Winton and Hemstead Rds., CINCINNATI, O. Walters Bros., 7911 Reading Rd., Cincinnati, O. Bids Apr. 12. CD 3/29.

▲ **Rodenbeck Realty & Development Co.,** 4800 Air Way, Dayton, O. Owner Builds. EST. $2,000,000. 300 HOUSES, 80-acre site, southeast edge of city, DEFIANCE, O.

▲ **Ben Apelbaum & Sons,** 163 E. Market St., Akron, O. Owner Builds. $5,000,000. 1,100 ft. front 32-store L-shaped University Plaza SHOPPING CENTER, 20-acre site south of Cherry St., bounded by S. Water and Franklin Sts., 3,000-car parking lot, KENT, O. John D. Jones & Assoc., c/o owner, archt.

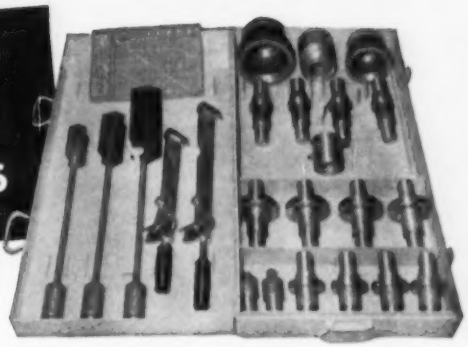
▲ **J & E Constr. Co.,** 2199 S. Green Rd., Cleveland 21, O. Own Forces. $1,443,000. 78 ranch HOMES, W. Minor Rd., MAYFIELD HEIGHTS, O. Awarded Apr. 15. CD 3/15.

▲ **J & E Constr. Co.,** 2199 S. Green Rd., Cleveland 21, O. Own Forces. $3,300,000. 200 HOMES in Bayridge development, WILLOWICK, O. CD 3/15.

▲ **Price & Price, Inc.,** 318 Ferry St., Lafayette, Ind., CA, $1,216,433. single student DORMITORY COURTS, 660 students, and 18 staff counselors, LAFAYETTE, IND. Bd. Trustees. Purdue University, West Lafayette, Ind. Bids Apr. 18. CD 4/4. Bids Apr. 18 on married students courts postponed. Will re-advertise. CD 4/4.

▲ **Algot B. Larson, Inc.,** 3837 W. Lake St., Chicago, Ill., CA, $1,000,000. BAKERY BLDG., Polk St. and Lavergne Ave., CHICAGO, ILL. National Baking Co., 321 E. 26 St., Chicago, Ill. Bids Apr. 2. CD 4/2.

"IN-PLACE" SHEAR READINGS



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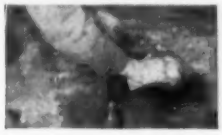

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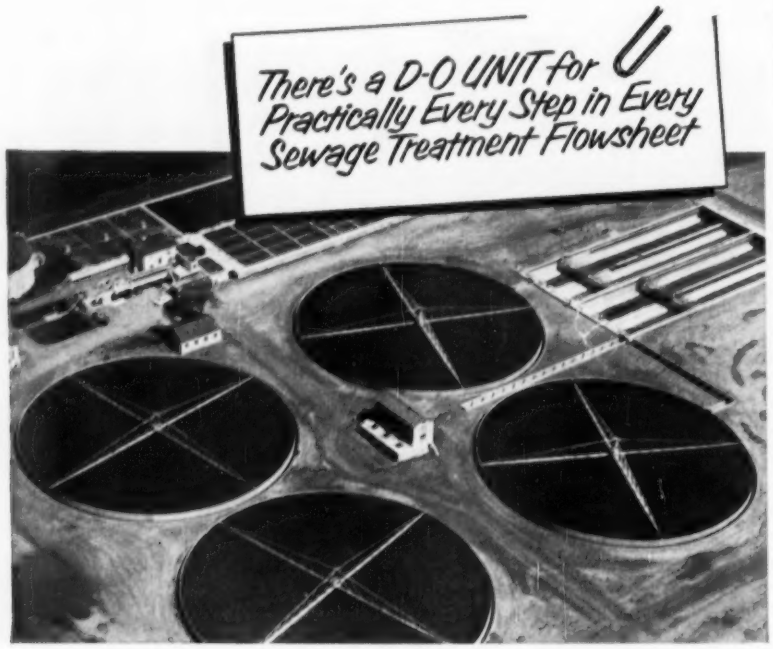

Aerial view of the El Paso plant with the two Monorake units shown at top right. Consulting Engineers: Ashley G. Clossen & Associates, El Paso, Texas

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▲ Siesel Constr. Co., 514 E. Ogden Ave., Milwaukee, Wis., CA, $2,083,434, general contract 8 story, tsmnt., 43x304 and 63x75 ft. RESIDENCE HALL, MILWAUKEE, WIS. Marquette University, 615 N. 11 St., Milwaukee, Wis. Bids Apr. 9. CD 4/12, under LB.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 8 Kansas — May 15, 16 Texas

STREETS AND ROADS

May 8 Kansas — May 15, 16 Kansas

▲† Tex., El Paso—APRON, etc.—BA About 5/18—U. S. Eng., P. O. Box 1538, Albuquerque, N. M., A615-000, apron, parking; A618-00, runway, primary. Biggs Air Force Base. $1,000,000-$5,000,000

▲† New Mexico—BA About 5/31—U. S. Eng., Box 1538, Albuquerque, Rio Chama Abiquiu Dam, flood control outlet, service and access roads, water supply and electrical systems, $1,000,000-$5,000,000. CD 11/9.

▲† Tex., Valentine—SITE FACILITIES—BA About 6/12—U. S. Eng., Box 1538, Albuquerque, N. M., AC&W "TM" site facilities (except access road), to incl. 12 bldgs., masonry constr. aggregating, approx. 53,000 sq. ft. floor area, fencing, utility lines, electrical distr. sys. Valentine Air Force Station, $1,000,000-$5,000,000.

BUILDINGS—BA

▲ Tex., Denver City—HIGH SCHOOL—BA 5/10—Sligo Independent School Dist., J. W. Jones, supt., Denver City, steel-concrete frame high school. $1,000,000. Plans deposit $100. Butler-Kimmel Co., 412 Avenue M. Lubbock, archt. CD 6/10.

▲ Minn., Minneapolis—HOSPITAL—BA 5/24—Fairview Hospital, C. Platour, admin. 2312 S. Sixth St., 4 story hospital addn. to existing bldg. $1,250,000. Ellerbe & Co., E. 505 First National Bank Bldg., St. Paul, archts. CD 10/18/54.

▲ Tex., Freeport—SHOPPING CENTER—Bids Asked—Freeport Land Co., c/o Dan L. Moody, Abstract & Title Bldg., Houston, expand capacity of Tarpon Inn Village Shopping Center, $1,250,000. CD 2/21.

HEAVY CONSTRUCTION—LB & CA

▲† Al Johnson Constr. Co., Foshay Tower, Minneapolis, Minn. LB $4,762,666. spillway and completion of embankment at Toronto Dam, Verdigris River, Woodson Co., Inv. 34-066-56-46, KANSAS. U. S. Eng., Box 61, Tulsa, Okla. Bids Apr. 4. CD 3/2.

▲† Trinity Constr. Co., Box 3024, Houston, Tex. LB $1,699,118, est. $1,000,000-$5,000,000. Brays Bayou channel rectification in part, at Brays Bayou, Houston, CIVENG-41-243-56-70, TEXAS. U. S. Eng., Box 1229, Galveston, Tex. Bids Apr. 17. CD 3/7.

▲ Permian Basin Pipeline Co., 2223 Dodge St., Omaha, Neb. CA $2,550,000. compressor station at Andrews, Andrews Co.; CA $250,000, 19 mi. crude pipe line, Andrews Co., TEXAS. Phillips Petroleum Co., Bartlesville, Okla. CD 1/19/54.

▲ J. W. Moorman & Son, Muskogee, Okla., CA $1,212,893, est. $1,500,000. earthen dam at Lake Arlington on Village Creek, ARLINGTON, TEX. City Hall, Arlington, Tex. Bids Mar. 24, awarded Apr. 20. CD 3/27, under LB.

▲ Sewer Constructors, Inc., 2505 Galveston Rd., Houston, Tex., LB $1,102,929, sanitary sewer collection sys. in Westbury area, HOUSTON, TEX. Harris County Water Control & Imprvt. Dist. 49, 5102 Willow Bend Blvd., Houston, Tex. Hilton & Coulson, 3821 Fannin St., Houston, Tex., engrs. Bids Apr. 14. CD 4/4, under LB.

▲† H. B. Zachry Co., Const. Div., Box 10188, San Antonio, Tex., CA $2,491,054. runways and taxiways paving and appurtenances for Naval Auxiliary Landing Field, NOy 86993, PORT ISABEL, TEX. Bureau Yards & Docks, Dpt. Navy, Admin. Bldg. No. 1, Naval Air Station, Corpus Christi, Tex. Bids Feb. 29. CD 3/7, under LB.

BUILDINGS—LB & CA

▲ Lovering Constr. Co., 59 W. Kellogg Blvd., St. Paul, Minn., and J. S. Sweitzer & Son, Inc., 777 Raymond Ave., St. Paul, Minn. (jointly) CA $4,094,393. general constr. central OFFICE for Minn. Hy. Dpt., ST. PAUL, MINN. State Dpt. Admin., 19 State Capitol, St. Paul, Minn. Grand total $6,106,615. CD 4/17, under LB;
R. L. Anderson-Cherme, Inc., 529 Cleveland Ave. N., St. Paul, Minn. CA $1,485,300. mechanical work (St. Paul, Minn.);
Kehne Electric Co., 722 Raymond Ave., St. Paul, Minn. CA $526,922. electrical work (St. Paul, Minn.).

▲ King Constr. Co., Box 39, Texarkana, Tex. LB $1,050,184. Fulton Street SENIOR HIGH SCHOOL, DENTON, TEX. Denton Independent School Dist., Denton, Tex. Bids Apr. 17. CD 3/29.

▲ R. F. Ball Constr. Co., 3738 W. Colfax St., Denver, Colo., CA $2,183,452, est. $1,200,000. two 3 story mens DORMITORIES and MAINTENANCE BLDG., FORT COLLINS, COLO. Colorado A & M College, Fort Collins, Colo. Bids Apr. 12, awarded Apr. 16. CD 3/12.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
May 17, 23 California
STREETS AND ROADS
May 16, 23 California

BUILDINGS—BA

▲ **Utah, Ogden**—PLANT—Bids Asked—Pacific Fruit Express, Union Depot, railroad icing plant to produce 750 tons of ice per day, on railroad property, 1½ mi. south of 33 St. $1,000,000.

HEAVY CONSTRUCTION—LB & CA

▲ **H. S. Wright & Co., Inc.**, 414 Pontius St., Seattle, Wash., CA $7,356,360, rein.-con. 8-lane place hangar with concrete shell roof, MOSES LAKE, WASH. Boeing Airplane Co., 7755 E. Marginal Way, Seattle 4, Wash. Bids Mar. 8. CD 3/13, under LB.

▲† **U. S. Eng.**, City-County Airport, Walla Walla, Wash. rejected bids Apr. 17, repair stone revetments along shory of McNary Dam Reservoir, Columbia and Snake Rivers, CIVENG-45-164-56-55, OREGON and WASHINGTON. LB $1,241,025. CD 4/23, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,
Webb & White and W. J. Disteli, 7220½ Melrose Ave., Los Angeles, Calif., LB $4,174,204 (6 bidders) 5 bridges, grading, paving 3.8 mi. Long Beach Freeway installing 2 pumping plants for Long Beach Freeway, South Gate, Los Angeles co. Bids 4/19. CD 3/23.

▲ **McGuire & Hester**, 796 66 Ave., Oakland, Calif., LB $1,302,367 (3 bidders) installing water mains, appurtenances at Upper San Leandro South Aqueduct, Piedmond No. 2 Reservoir Line, Seneca Reservoir Line, Seneca Reservoir Outlet Line, Spec. 685, OAKLAND, CALIF. East Bay Municipal Utility Dist., 512 16 St., Oakland, Calif. Bids Apr. 13. CD 4/5.

BUILDINGS—LB & CA

▲ **Ross B. Hammond Co.**, Box 3901, Portland, Ore., LB $1,110,597 (6 bidders) Unit 1, BIOLOGICAL and AGRICULTURAL SCIENCE BLDG.; LB $1,455,798 (5 bidders) two men's DORMITORIES and CAFETERIA, Oregon State College, CORVALLIS, ORE. State Bd. Higher Educ., University of Oregon, Eugene, Ore. Bids Apr. 20. CD 3/8.

▲ **Roven Spiegel**, 5656 W. 3 St., Los Angeles, Calif., CA, $1,635,200. 146 frame, stucco DWELLINGS, Tract 2750, COSTA MESA, CALIF. Mesa Estates, 5656 W. 3 St., Los Angeles, Calif.

▲ **Gust. K. Newberg Constr. Co.**, 2040 N. Ashland St., Chicago, Ill. LB $7,037,000 (3 bidders) 3 story VETERANS HOSPITAL addn., LONG BEACH, CALIF. Veterans Admin., Munitions Bldg., Wash., D. C. Bids Apr. 24. CD 3/8.

▲ **Larwin Co.**, 8692 Wilshire Blvd., Beverly Hills, Calif. Owner Builds. $1,043,500. 115 frame, stucco DWELLINGS, on Valley View Blvd., Mausa Dr. and Bora Dr., NORWALK, CALIF.

▲ **R. A. Carey Co.**, San Anselmo, Calif. Owner Builds. $3,000,000. SHOPPING CENTER, incl. motel, restaurant and service station, PETALUMA, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
May 8 Saskatchewan — May 7 British Columbia

BUILDINGS—BA

▲ **Man., Winnipeg**—HOTEL, etc.—BA 5/16—Marlborough Hotel, Smith St., 10 story annex, 100x120 ft., rein.-con. Marlborough Hotel addn., alterations, Smith St. $1,500,000. Libling, Michener, Diamond, 138 Portage E., archts. CD 8/29.

BUILDINGS—LB & CA

▲ **N. W. Hullah Corp., Ltd.**, 1415 Welch St. N., Vancouver, B. C., CA, $3,400,000. HOUSING DEVELOPMENT, incl. 200 houses, KITIMAT, B. C. Aluminum Co. of Canada Ltd., Sun Life Bldg., Montreal, Que.

▲ **Point Pleasant Investments Ltd.**, 771 Upper Water St., Halifax, N. S. Owner Builds. $1,200,000. HOUSING, incl. 100 housing units, at Greenbank Community south section of city, HALIFAX, N. S.

▲ **Argo Constr. Ltd.**, 18 Gladstone Ave., Montreal, Que., CA, $1,098,400 (6 bidders) WOMEN'S PRISON BLDG., Collins Bay, KINGSTON, ONT. Dpt. Justice, Penitentiaries Branch, Justice Bldg., Ottawa, Ont. Bids Apr. 16. CD 3/5.

FOREIGN

HEAVY CONSTRUCTION—LB & CA

▲ **H. K. Ferguson Co. of Great Britain, Ltd.**, c/o H. K. Ferguson Co., 1783 E. 11 St., Cleveland, O., U. S. A. CA Est. $6,000,000, design and construct titanium fabrication mill, office and auxiliary facilities, WAUNARLWYDD, SOUTH WALES. Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London S.W. 1, England.

(Proposal Advertisements see p. 114 to 117)

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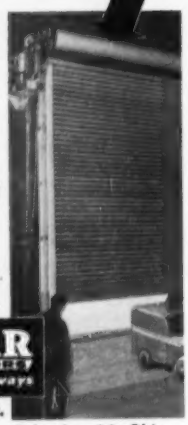

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Unit Prices

Sanitary Sewer, R. I.

For $746,031, Johnston, Rhode Island, will get a new sanitary sewer system with about 22.67 miles of vitrified clay and asbestos cement pipe. Haley and Ward, Boston, Massachusetts, designed this project as consulting engineers for the Johnston Sanitary District.

V. F. Capaldi Construction Company of Centredale, R. I., is the successful bidder. His low bid is 0.95% above the engineers' estimate but 6.6% below the second low bid.

Wage rates are $3.57 for skilled laborers, $2.72 for semi-skilled and $1.80 for common laborers.

The bidders include:

1C V. F. Capaldi Const. Co., Centredale, R. I.	$746,031
2 Capaldi Bros. Const. Co., Providence, R. I.	788,583
11 Civitarese-Piatelli Const. Co., Hyde Park, Mass.	1,070,000
EE Haley and Ward, Boston, Mass.	739,000

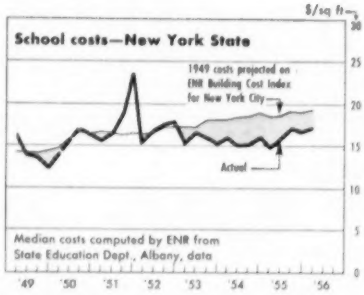
Bids: 2-27-56 Items	Unit	Quantity	Unit Prices 1C	2
Excav, earth, 0-8'	cy	63,900	$1.85	$2.40
8-12'	cy	1,440	2.50	3.50
below 12'	cy	240	3.50	6.00
rock, 0-8'	cy	9,100	9.00	9.00
8-12'	cy	630	12.00	12.00
below 12'	cy	140	16.00	15.00
Pipe, VC, 8"	lf	59,000	2.25	2.20
10"	lf	970	3.40	3.25
12"	lf	1,090	3.50	5.00
Pipe, VC 15"	lf	470	4.10	6.00
AC, cl I, 8"	lf	25,000	2.90	2.75
10"	lf	5,050	3.35	3.00
12"	lf	4,600	3.90	5.50
cl II, 16"	lf	400	6.40	9.00
cl 100, 8"	lf	530	3.25	3.00
10"	lf	600	3.75	3.50
12"	lf	725	4.55	5.50
Subdrain, VC, 8"	lf	10,000	1.00	1.25
House conn, VC, 5"	lf	15,000	1.45	1.25
AC, 5"	lf	9,990	1.60	1.25
Risers (chimneys), VC, 5"	lf	1,000	2.00	5.00
Pipe Y, VC, 8x5"	ea	3,000	3.00	5.00
10x5"	ea	50	8.00	14.00
12x5"	ea	50	10.00	15.00
AC, 8x5"	ea	850	10.00	10.00
10x5"	ea	25	11.00	12.00
12x5"	ea	25	13.00	15.00
Curves, VC, 5"	ea	900	1.90	3.00
AC, 5"	ea	200	6.00	8.00
Stoppers, VC, 5"	ea	4,000	0.45	0.30
Saddles, CI, for ACP, 8x5"	ea	190	7.50	7.00
10x5"	ea	70	8.00	8.00
12x5"	ea	40	10.00	8.50
MH, to 5' deep, clay bk	ea	100	150.00	135.00
cmt bk	ea	100	125.00	110.00
cmt block	ea	230	80.00	90.00
wall rings, clay bk	vf	300	30.00	25.00
cmt bk	vf	300	24.00	20.00
cmt block	vf	100	15.00	13.00
fndns, conc mary, 1:3:6	cy	260	30.00	30.00
waterproofing	sy	1,000	2.25	4.00
frames & covers, CI	ea	430	35.00	40.00
steps, CI	ea	800	0.90	1.10
wi	ea	800	1.50	1.50
Refill, gravel, screened	cy	2,500	3.50	3.00
backrun	cy	15,000	1.15	1.30
Pave, conc, replace	sy	2,700	5.00	6.00
bit, penetration	sy	4,150	2.75	2.85
Gravel, oiled	sy	42,000	0.85	0.90
Surf, temp, bit & type I	sy	17,800	1.15	1.15
Sidewk, bit conc	sy	50	6.00	2.00
CC	sy	50	9.00	5.00

Work started: 4-9-56 Time to complete: 10 months
No liquidated damages

School Prices Rising in New York State

Contract prices for elementary K-6 and secondary 7-12 schools in New York State took a sharp upturn during the second half of 1955. Evidence that this uptrend will continue comes from contracts let in January-February 1956.

This cost upturn broke about 18 months of stability when school prices bumped along at $15-$16 per sq ft in spite of rising material and labor costs. (ENR, October 13, 1955, p. 76.)



Schools in New York State Cost This Much per Square Foot

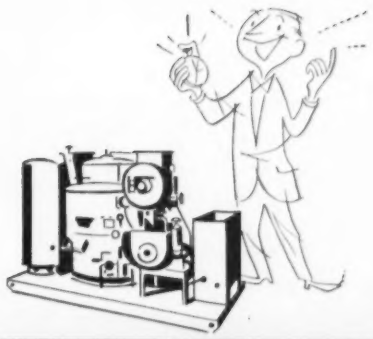
State Education Department, Division of School Buildings and Grounds

Elementary, K-6 — Secondary, 7-12

	No of Schools K-6 Total	$ per sq ft for schools with . . . 1 Large Unit* Min	Med	Max	2 Large Units* Min	Med	Max	3 Large Units* Min	Med	Max	No of Schools 7-12 Total	$ per sq ft Min	Med	Max
1949	29	$10.40	$14.60	$19.20	$12.00	$14.60	$18.70				4	$13.20	$13.55	$16.20
1950	20	10.85	17.00	20.80	13.75	16.66	17.80				4	13.35	13.70	14.40
1951	59	12.30	16.45	25.40	18.70	20.25	22.60	$13.90	$23.60	$29.20	6	15.40	16.97	19.30
1952	57	11.40	16.30	20.20	13.00	17.60	21.10	14.20	18.20	23.30	7	15.00	17.10	19.90
1953	65	10.20	16.05	23.40	13.60	16.15	19.40	11.30	16.30	18.80	12	14.15	16.00	18.80
1954	78	10.00	14.55	20.80	12.80	16.05	21.80	14.80	15.30	18.40	17	13.70	15.60	18.00
1955	54	11.75	16.40	23.60	11.90	15.70	20.25	14.55	14.90	15.90	13	12.55	17.10	18.40
'55, Q1	19	13.60	16.40	17.35	12.70	14.53	15.90	14.55	14.90	15.50	4	12.55	15.15	17.50
Q2	15	11.75	15.83	19.90	11.90	15.70	17.20				3	15.60	17.20	17.30
Q3	8	17.50	18.25	19.00	15.90	16.60	20.25				4	15.30	16.40	17.40
Q4	12	15.50	16.95	23.60					15.90		2	18.25	18.33	18.49
'56, Q1 †	4		14.95		17.00	17.50	18.50				2	16.75	18.83	20.90

† January and February. * Large Unit includes a general purpose room, gymnasium, auditorium, multi-purpose or other group activity room.

These are costs based on the four contracts—general construction, plumbing, electrical, heating and ventilating. They include built-in features, but no movable furniture or equipment. Some minor site improvement may be included, but no major site work and no land costs.



LITTLEFORD

KWIK-STEAM . . .

BEST STEAM GENERATOR FOR PILE DRIVING

- ★ Steam in 2 minutes from a cold start!
- ★ 135 bhp—can drive 11-B-3 M-T hammer
- ★ Completely automatic operation—burner cycles on and off as required
- ★ Saves 50% on fuel and labor
- ★ No wasteful "head of steam"
- ★ No steam explosion risk—approved safety controls
- ★ Easy to move, weighs only 6000 lbs.
- ★ Highly mobile—can be mounted on crane, barge or truck

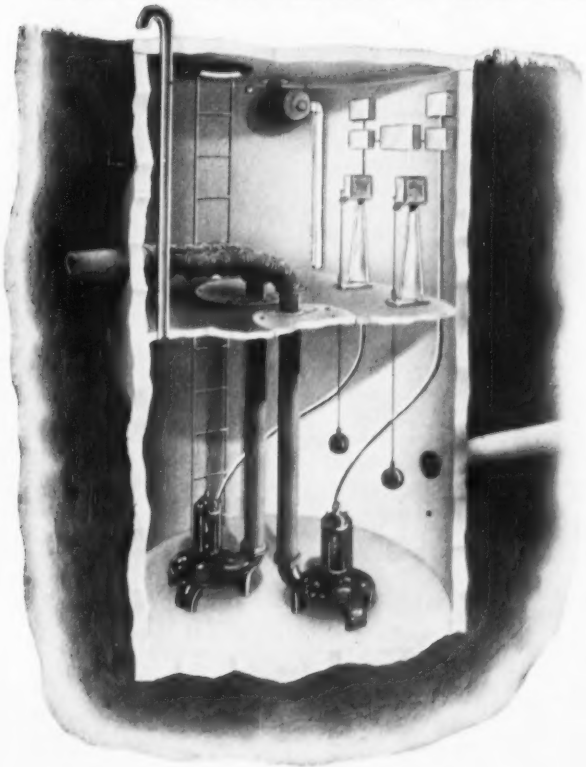
Littleford Kwik-Steam—the modern steam generator for pile driving—fast, economical, mobile. For further information, send for bulletin 22. Littleford Bros. Inc., LB 214, 415 E. Pearl St., Cincinnati 2, Ohio.

LB LITTLEFORD

TOPS IN BLACK TOP

KWIK-STEAM DESIGNED EXCLUSIVELY FOR GENERATING STEAM FOR PILE DRIVING, READY-MIX, CONCRETE CURING PRODUCTS, ASPHALT PLANTS

The SUBMERSIBLE SEWAGE EJECTOR



Engineered for

UNDERGROUND LIFT STATIONS
HIGHWAY UNDERPASS DRAINAGE

The **weil** NON-CLOG Screenless Submersible Sewage Pump with the BLADELESS impeller will pump ALL sewage and drainage water — household sewage, industrial sewage and waste — even rags.

Capacities 35 to 2000 GPM with heads to 70 feet.
Discharges: 3", 4", 5" and 6"; ½ to 20 H.P. Motors.

Illustration shows economical installation which DOES NOT REQUIRE A PUMP HOUSE to mar the landscape. This reduces the overall cost of the Lift Station or Underpass Pumping Station.

Special Bulletin SE-862

New Bulletin SE-862 specially prepared for Lift Station Design is now available upon request. This bulletin gives possible layouts, minimum dimension requirements, specifications on fittings and suggested piping diagram. **Write for it today!**

weil PUMP COMPANY

1528 NORTH FREMONT ST. • CHICAGO, ILLINOIS

Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- May 10—Cement, Aggregate, Ready-mixed Concrete, Asphalt
- May 17—Iron and Steel Products, Pipe
- May 24—Wood Products, Glass, Explosives, Chemicals
- May 31—Clay Products, Lime, Plaster, Paint, Roofing

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	GYPSUM PLASTER BOARD tapered edge per Msq ft ½"	⅝"	GYPSUM BOARD LATH plain or perf per Msq ft ½" x 16" x 48"	GYPSUM SHEATHING tongue & groove per Msq ft ½" x 2' x 8'	FIBER BOARD SHEATHING asph impreg & coat per Msq ft ½" sq ed	½" T&G	FIBER BOARD INSULATION sq edge, paint per Msq ft ½"	MINERAL WOOL INSULATION† loose, per 40-lb bag a	3" batts per M sf	GLASS FIBER INSULATION† loose, per 40-lb bag a	3" batts per M sf	ALUMINUM FOIL #60 Kraft per roll of 250 s. f.	Expansible Blanket 2 layers foil per Msq. ft.
Atlanta	$75.00	$85.00	$45.00	$75.00	$77.00	$127.00	$77.00	$1.08	$75.00	$1.45[b]	$85.00	.....	.....
Baltimore	51.25[f]	44.75[f]	32.55[f]	55.00[f]	65.00[f]	108.50[f]	69.00[f]	1.30	66.50	1.60	45.00	$4.00[g]	$33.50
Birmingham	79.00	65.00	51.11	82.00	77.00	130.00	76.00	1.40	70.00	1.60	75.00	3.39[g]	.....
Boston	56.00[m]	46.50[m]	33.00[m]	52.00[m]	64.00[m]	109.00[m]	79.00[kn]	1.45	75.00	.....	52/56	5.80	54.50
Chicago	65.00	52.00	43.00	69.00	80.00	120.00	80.00	1.85	80.00	.....	63/65[bb]	5.25[r]	.....
Cincinnati	46.40[w]	41.60[w]	30.80[g]	49.81[g]	67.50[w]	115.00[w]	67.50[w]	1.25	60.00	1.25	73.50	2.81	50.00[w]
Cleveland	60.50	55.00	40.00	65.00	70.00	111.00	70.00	1.35/1.50	70.00	1.60[ee]	80.00[ee]	17.50[r]	50/55
Dallas	58.00	55.00	42.50	65.00	73.50	122.50	70.00	1.90	65.00	1.35	65.83	4.25	.....
Denver	62.00	54.50	41.00	62.00	75.50	126.00	74.50	.....	71.00[s]	1.47	55.00	11.00[r]	21.00
Detroit	53.00	48.00	36.00	57.50	58.50	98.00	57.50	.....	.....	1.95[b]	83.00	.....	.....
Kansas City	65.00	55.00	40.00	65.00	72.00	120.00	75.00	1.40	80.00	1.40	80.00	11.24[dt]	19.44
Los Angeles	60.00	52.50	0.325[z]	60.00	71.87	121.25	60.00	.....	63.00	1.35[s]	64.00	4.20[g]	.....[z]
Minneapolis	72.00	63.00	0.40[z]	80.00	70.00	114.00	70.00	1.60	78.00	1.60	78.00	6.50	.....
Montreal	55.00	48.00	36/39	53.00	60.00	.....	62.00	1.10	60.00	1.10	60.00	20.00[s]	50.00
New Orleans	70.00	60.00	45.00	85.00	67.50	125.00	75.00	1.95	88.00[ee]	.....	.....	15.66	.....
New York	52.00	45.50	35.00	53.00	69.00	109.00	70.50	1.55	69.00	1.90[b]	72.00	5.20	48.80[cc]
Philadelphia	50.00	48.00	34.00	48.50	67.50	105.00	49.20	.....	63/70	.....	70/75	5.50/6.34	50/44.50
Pittsburgh	55.00	55.00	40.00	68.00	65.00	105.00	60.00	1.90	72.00	1.90	72.00	4.10	.....
St. Louis	55.00	55.00	40.00	65.00	75.00	120.00	75.00	1.60	85.00	1.65	64.50	4.75[s]	.....
San Francisco	52.00[c]	44.75	0.34[z]	56.00[k]	58.00	94.00	56.00	1.60	66.50	1.55	66.50	4.82	52.50
Seattle	63.50	57.50	46.60	63.50	72.50	122.00	71.50	1.75[y]	81.00	1.60[aaz]	84.00[aa]	4.25[g]	46.50
Toronto	51.00	50.00	40.00	64.50	75.00	.....	.....	0.90	51.00	.....	51.00	16.10[s]	39.50

[a] for hand packing [b] per 30# bag [c] carloads [d] 40# kraft paper [f] full trailer loads [g] 60# kraft paper backing [h] LCL [i] flameproof $75.00 [k] plain core; asph core $56/M sq ft [m] 10 ton quantities [n] distributor's siding [o] per Msf roll [p] per sf [r] per cwt [s] per 35# bag [t] per M sq ft [w] fob city [x] per sq. yd. [y] 25# bag x 32# bag [aa] fob warehouse [bb] 2" [cc] in 250 sf rolls, of 16", 20", or 24" width.

HOURLY WAGE RATES—Base rate + fringe benefits

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor Building	Common Labor Heavy Const
Atlanta	$3.25	$2.70	$2.95	$2.70	$2.875	$3.00	$3.05+10¢[r]	$1.40	$1.40
Baltimore	3.45+10¢[r]ff	2.95+7½¢[t]	3.50+7½¢[t]	2.70/2.95+10¢[t]	3.25+7½¢[t]	3.30[f]	3.20+7½¢[t]	1.60+7½¢[t]	1.60+7½¢[t]
Birmingham	3.50	2.60	2.925+7½¢[k]	2.42	2.82	3.175	3.05+7½¢[k]	1.50	1.60
Boston	3.25+10¢[t]	3.05+10¢[t]	3.40+7½¢[k]	3.40	3.25+20¢[t]	3.10+12¢[k]	3.20+10¢[t]	2.15+7¢[t]	2.15+7¢[t]
Chicago	3.55+7½¢[k]	3.275+10¢[r]	3.425+7½¢[k]	3.175+5¢[m]	3.47+23¢[r]	3.48+21¢[r]	3.30+22¢[m]	2.50+7½¢[k]	2.50+7½¢[k]
Cincinnati	3.45	3.15	3.20+7½¢[k]	2.925/3.175	3.225	3.375+3¢[k]	3.25+9½¢[z]	2.20	2.10
Cleveland	3.40+7½¢[k]	3.40	3.325+7½¢[k]	3.40	3.40	3.425	3.30+10¢[t]	2.65	2.65
Dallas	3.625	2.875	2.95	2.875+7½¢[k]	3.437	3.00	3.105+8¢[kk]	1.50	1.50
Denver	3.50	2.975	3.00+7½¢[t]	2.93	3.30+7½¢[t]	3.00	3.05+15¢[t]	2.00	2.00
Detroit	3.38+20¢[ee]	3.10+22¢[ee]	3.325+15¢[t]	3.15+15¢[ee]	3.36+23¢[t]	3.35+30½¢[ll]	3.295+22½¢[k]	2.40+15¢[ee]	2.45+10¢[r]
Kansas City	3.625[w]	2.90	3.075	3.095	3.375	3.20+13¢[ll]	3.15+7½¢[k]	2.155	2.18
Los Angeles	3.60	3.30+10¢[ss]ff	3.35+7½¢[k]	2.81+10¢[r]	3.625+12½¢[k]	3.45	3.425+10¢[r]	2.30+7½¢[k]	2.30+7½¢[k]
Minneapolis	3.425ff	3.00ff	3.17ff	2.95ff	3.05+13¢[r]ff	3.00+20¢[m]	3.00+7½¢[k]	2.25	2.25
New Orleans	3.175	2.60	2.90+7½¢[k]	2.80	2.90	3.025+7½¢[k]	3.00+10¢[r]	1.475	1.475
New York	3.80+35¢[tt]	3.55+28¢[ll]	3.85+33¢[r]	3.80+30¢[r]	3.85+50¢[k]	3.50+38¢[ss]	3.75+34¢[ll]	2.50+20¢[t]	2.50+20¢[t]
Philadelphia	3.75+17¢[r]	3.30	3.55+18¢[ss]	3.07/3.82+10¢[r]	3.50+15¢[r]	3.65+15¢[ss]	3.50+11½¢[r]	2.025	* 2.325
Pittsburgh	3.60+17½¢[ss]	3.20+7½¢[k]	3.30+7½¢[k]	3.35+7½¢[k]	3.40+17½¢[ss]	3.50	3.45+7½¢[k]	2.10+7½¢[k]	1.98+10¢[r]
St. Louis	3.75+10¢[r]	3.25+7½¢[k]	3.25+7½¢[k]	3.325	3.425+10¢[r]	3.50+25¢[r]	3.45+21¢[ll]	2.30+7½¢[k]	2.30+7½¢[k]
San Francisco	3.75+12½¢[r]	3.06+10¢[r]	3.25+10¢[r]	2.86+10¢[r]	3.56+7½¢[k]	3.224+20¢[r]	3.20+36¢[k]	2.175+10¢[r]	2.175+10¢[r]
Seattle	3.40+10¢[r]	2.80+10¢[r]	3.07+10¢[r]	2.90+10¢[r]	3.15+10¢[r]	3.16+13½¢[k]	3.10+21¢[r]	2.37+10¢[r]	2.37+10¢[r]
Montreal	2.10+14¢[t]	1.90+14¢[t]	2.00+14¢[t]	1.80+14¢[t]	2.12+18¢[t]	2.10+18¢[t]	2.12+18¢[t]	1.30+10¢[t]	1.30+10¢[t]
Toronto	2.46+10¢[ee]	2.30+11¢[ee]	2.30+9¢[ee]	2.35+9¢[ee]	2.40+16¢[ee]	2.50+10¢[ee]	2.44+10¢[ee]	1.35+6¢[ee]	1.35+6¢[ee]

ENR Skilled Average (Bricklayers, Carpenters, Iron workers): **$3.328. ENR Common Average $2.123**

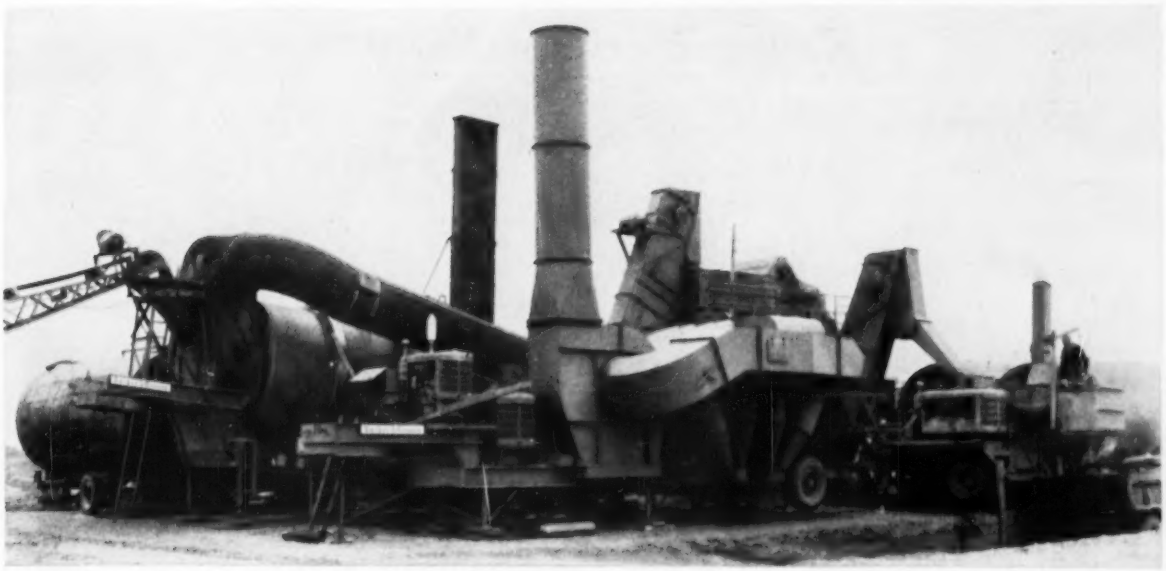
* Cost of living bonus now included in basic wage. † 8% fringe benefits. ** 4% vacation fund. [a] 6 hr. day. [b] 7 hr. day. [c] 3% vac. stamp fund plus 7½¢ WF for bricklayers; 4% VF for electricians plus 8¢ WF, 1% PF. [d] 10¢ H&WF. [e] 10¢ VF. [f] 6% WF. [g] 11½¢ WF. [h] $2.85 homes & housing plus 7½¢ WF. [i] 17¢ WF. [j] 10½¢ hr. WF. [k] 7½¢ hr. WF. [l] 4% VF. [m] 5¢ hr. WF. [n] 8¢ H&WF, 6% VF, 1% PF. [o] 10¢ PF. [p] 3% WF, 3% PF. [q] 10¢ ins; 4% vac. and holiday pay. [r] 4% WF and 20¢ PF. [s] 5% W&PF, 4% VF, 1% NC, 6 PH. [t] 7½¢ H&WF. [u] 1½% PF. [v] 10¢ WF. [w] Negotiating. [x] 5¢ VP. [y] 23¢ WF. [A] 15¢ WF, 15¢ PF, 20¢ B.F. [C] 15¢ WF. [D] 10¢ H&WF, 5¢ organ. [E] 6% WF, plus travel pay per day. [F] Plus $4 per day Annuity contrib. [G] 3¢ Prom. [H] 7¢ WF, 6% VF. [I] 15¢ H&WF, 5¢ for Advtg. [J] 5% WF, 6 PH. [K] 1½ WF, 12½¢ VF, 10¢ PF. [L] 3% WF, 3% PF, 2% VF, 1% EF. [M] 7½¢ PF. [N] 1% WF. [O] 10¢ WF, 1% PF. [P] 10¢ hosp. ins.; 5¢ vac. [Q] 1 drum, 2 drums 3.40/3.55+10¢ [R] 12¢ WF and 1¢ apprentice [S] 12½¢ H and WF. [T] 21¢ H, W & VF. [U] 7½¢ WF, 4% VF. [V] 5% WF, 3% PF. [W] 2% F. [X] 6¢ VF, & 7½¢ H & WF. [Y] 7¢ H & WF. [Z] 9½¢ WF. [aa] 7¢ WF, 15¢ PF. [ab] 8¢ WF. retro. 4/1/56 ## eff. 5/1

	Truck drivers 1½ T	Truck drivers 4 cy	Truck drivers +4 cy	Tractor Operators incl. bulldozers 34-40 hp	Tractor Operators incl. bulldozers 70-100 hp	Tractor Operators incl. bulldozers 100 & over	Tractor scraper 16-16 cy	Power cranes & shovels ½ cy	Power cranes & shovels ¾ cy	Motor grader oper	Air comp oper	Air tool oper
Atlanta	$1.50	$	$	$2.425	$2.425	$2.425	$2.425	$2.95	$2.95	$2.425	$2.20	$1.60
Baltimore	1.60+7½¢[m]	1.75+7½¢[m]	1.85+7½¢[m]	2.85/3.00[p]	2.85/3.00[p]	2.85/3.00[p]	2.85/3.00[p]	3.40/3.55+10¢[m][p]	3.40/3.55+10¢[m][p]	2.85/3.00[p]	2.85/3.00[p]	2.25
Birmingham	1.50	1.85[ff]	1.92[ee]	2.56	2.56	2.56	2.70	2.70	2.70	2.61	2.285	1.65
Boston	2.10[r]	.....	.....	3.025[d]	3.025[d]	3.025[d]	3.025[d]	3.40	3.40	3.40	2.93	2.22[e]
Chicago	2.08+12¢[ee]	.....	.....	2.85+5¢[r]	3.00+5¢[r]	3.05+5¢[r]	2.85+5¢[r]	3.45+5¢[r]	3.45+5¢[r]	2.95+5¢[r]	2.95+5¢[r]	.....
Cincinnati	2.20[ee]	2.30[ee]	2.40[ee]	2.925	2.925	2.925	2.925	3.175	3.175	3.175	3.175	3.175
Cleveland	2.42	2.42	2.42	3.15	3.15	3.15	3.15	3.40	3.40	3.15[s]	3.025	3.025
Dallas	1.50	1.50	1.50	1.50/2.625[f]	1.50/2.625[f]	1.50/2.625[f]	1.50/2.625[f]	1.50/2.625[f]	1.50/2.625[f]	1.50/2.625[f]	1.50/2.00[f]	1.50/2.00[f]
Denver	2.15	2.15	2.25	2.15	2.76	2.76	2.76	2.93	2.93	2.76	2.76	2.35
Detroit	2.35	2.35	2.35	3.20+10¢[m]	3.20+10¢[m]	3.20+10¢[m]	3.20+10¢[m]	3.20+10¢[m]	3.20+10¢[m]	3.20+10¢[m]	2.925+10¢[m]	2.58+20¢[m][cc]
Kansas City	2.115[s]	2.115[s]	2.19[s]	2.30	2.85[s]	2.85[s]	2.85[s]	3.095	3.095	2.71	2.85[s]	2.24
Los Angeles	2.415+7½¢[m]	2.415+7½¢[m]	2.435+7½¢[m]	2.90+10¢[m]	2.90+10¢[m]	2.90+10¢[m]	3.24+10¢[m]	3.05+10¢[m]	3.06+10¢[m]	3.06+10¢[m]	2.49+10¢[m]	2.51+7½¢[m]
Minneapolis	2.15	2.25[s]	2.40[s]	2.63	2.85[s]	3.07[s]	2.85	3.07[s]	3.35[s]	2.63	2.52	2.35
New Orleans	1.575	1.575	1.575	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.15	1.575
New York	2.12½+13¢[ee]	2.75+14¢[tt]	2.75+14¢[tt]	3.17½+25¢[ee]	3.17½+25¢[ee]	3.17½+25¢[ee]	3.30+26¢[ee]	4.05+32¢[ee]	4.05+32¢[ee]	3.30+26¢[ee]	3.30+26¢[ee]	2.90+14½¢[ee]
Philadelphia	——— 1.925/2.1125+7½¢[m] ———			——— 3.07/3.82+10¢[m] ———			3.07/3.82+10¢[m]	——— 3.07/3.82+10¢[m] ———		3.07/3.82+10¢[m]	2.89+10¢[m]	2.05+10¢[m]
Pittsburgh	2.20+7½¢[m]	2.20+7½¢[m]	2.20+7½¢[m]	2.87½+7½¢[m]	3.20+7½¢[m]	3.27½+7½¢[m]	3.25+7½¢[m]	3.35+7½¢[m]	3.35+7½¢[m]	3.25+7½¢[m]	3.35+7½¢[m]	2.20+7½¢[m]
St. Louis	2.30+7½¢[m][ss]	———	———	3.325	3.325	3.325	3.325	3.325	3.325	3.325	2.775	2.775
San Francisco	2.32½+10¢[r]	2.32½+10¢[r]	2.465+10¢[r]	2.97+10¢[m]	2.97+10¢[m]	2.97+10¢[m]	2.97+10¢[m]	3.20+10¢[m]	3.30+10¢[m]	3.13+10¢[m]	2.68+10¢[m]	2.30+10¢[m]
Seattle	2.63+7½¢[ee]	2.63+7½¢[ee][dd]	2.83+7½¢[ee]	2.78+10¢[m]	2.95+10¢[m]	2.95+10¢[m]	2.95+10¢[m]	3.36+10¢[m]	3.36+10¢[m]	3.10+10¢[m]	2.78+10¢[m]	2.52+10¢[m]
Montreal	1.30+10¢[ll]	1.30+10¢[ll]	1.30+10¢[ll]	1.73+14¢[ll]	1.73+14¢[ll]	1.73+14¢[ll]	1.73+14¢[ll]	1.99+16¢[ll]	1.99+16¢[ll]	1.73+14¢[ll]	1.80+15¢[ll]	1.60+15¢[ll]
Toronto	1.45+6¢[ee]	1.45+6¢[ee]	1.65+7¢[ee]	1.90+8¢[ee]	1.90+8¢[ee]	1.90+8¢[ee]	1.90+8¢[ee]	2.35+10¢[ee]	2.35+10¢[ee]	———	2.05+8¢[ee]	2.05+8¢[ee]

[a] 5¢/hr HWF [b] lower rates, straight time, other broken [c] 2-axle; 10-wheel $2.15; Euclid $2.45 [d] Intermediate [e] bldg constr; highway $2.145 [f] less than 2-t [g] blade [h] scoop, bldg [i] scoop, road [j] plus $2 pd by employer for hosp. death benefits to family [k] bldg constr; steel constr $3.40 [l] higher rates are union, other taken from min wage scale approved by County Commissioners Court [m] 10¢ H&WF [n] flatbed [o] under 10 cy [p] over 10 cy [q] over 50 hp [r] blade grader [s] form and subgrade [t] single [u] 7½¢ HWF [v] up to 6 cy [w] 6 & 8 cy [x] cat oper [y] up to 3½ cy [z] 3½ cy & over [aa] plus approx $5.30 per wk W&PF [bb] 3% WF, 2% PF, 11 PH [cc] 8% WF & 3% PF [dd] up to 5 cy [ee] 5 cy & over [ff] over 1½, T but not incl 3 [gg] over 3 but not incl 5 tons [hh] excavating [ii] 4% VP [jj] 12¢ H, W & PF [kk] 7½¢ WF included in base pay [ll] 8% fringe benefits [mm] 10¢ H & WF, 10¢ insurance [nn] 8 cy or less; 8-16 cy $2.90; 16-25 cy $3.15 [oo] Plus $2.25/wk WF [pp] 2-5 T $1.70 [rr] 12¢ WF [ss] 5% WF ##retro. 4/1/56

MEXICO CITY PRICES

In Pesos, f.o.b. City		Feb. '56	Mar. '56
Common Wages—Building (8 hr. day) (Pesos)	av. per hr.	1.38	1.38
Common Wages—Heavy Const. (8 hr. day) (Pesos)	av. per hr.	1.38	1.38
Skilled Labor Wages			
Carpenters (8 hr. day) 1 cl.	av. per hr.	2.44	2.44
Bricklayers (8 hr. day) 1 cl.	av. per hr.	2.44	2.44
Struct. Iron Workers (8 hr. day) Remachadores.	av. per hr.	3.75	3.75
Struct. Steel, Shapes		Feb. '56	Mar. '56
3"-15" x 12 meters	per metric ton	1564.34[f]	1564.34[f]
[f] fob Monterrey			
Reinf. Steel, Corr. Rods			
¼" x 11 meters	per ton	1650.00	1650.00
⅜" x 11 meters	per ton	1650.00	1650.00
½" x 11 meters	per ton	1650.00	1650.00
⅝" x 11 meters	per ton	1650.00	1650.00
¾" x 11 meters	per ton	1650.00	1650.00
1" x 11 meters	per ton	1650.00	1650.00
Gravel truck load of 3½ cu. meters		Feb. '56	Mar. '56
Blue Gravel	per tr. load	70.00	70.00
Rose Gravel	per tr. load	65.00	65.00
Cement, Std. Port. (Tolteca)	per ton	200.00	200.00
Lumber			
3rd Class Pine	per M ft.	1900.00	1900.00
1st Class Pine	per M ft.	2750.00	2750.00
2nd Class Pine	per M ft.	2300.00	2300.00



How to lower the cost of asphalt paving

with Barber-Greene Continuous Plants . . . available in capacities from 20 to more than 200 tons per hour. Built for maximum portability, these plants produce all types of mixes at highest capacity, and for lowest operating cost. Once the proportions are set, operation is automatic; the human element is eliminated and manpower requirements are reduced to a minimum.

with Barber-Greene BatchOmatics . . . available in 2000, 4000 and 6000 pound sizes. Operating on inherently automatic principles, these plants save seconds at every point in the cycle. Instant changeover from automatic operation to manual production of mixes for the drive-in trade . . . instantly reset to preset repetitive cycle operation. New Dyna-Mix pugmill gives faster coating.

with the Barber-Greene Finisher. Having the widest choice of operating speeds, the Barber-Greene Finisher can lay every job at the maximum speed. It provides positive traction, superior maneuverability and unmatched ease of operation. Wide receiving-hopper simplifies truck discharge, eliminates spillage. No other machine paves as permanently, as speedily and as economically.

Write for literature on any plant in the cost-cutting line. Specify capacity. 56-25-AL

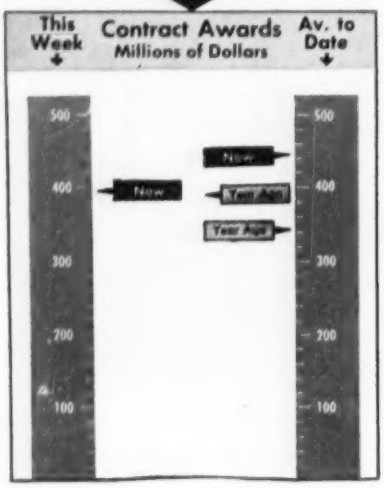
Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 18 wks 1956	Chge %
	$ millions		
Federal	$20.9	$599.5	+21
State and Municipal	129.3	2,162.3	+26
Total Public	150.2	2,761.8	+20
Total Private	238.8	5,249.1	+35
U. S. Total	$389.0	$8,010.9	+29
By Type of Work			
Waterworks	$3.8	$104.0	+17
Sewerage	12.1	227.4	+66
Bridges	13.3	206.8	+26
Highways	40.6	780.0	+16
Earthwork, Waterways	4.3	219.3	+48
Buildings:			
Public, Excl. Hsg.	46.1	665.1	+15
Public Housing	10.7	142.9	+59
Private Housing	102.4	2,263.9	+1
Commercial	28.5	702.0	+25
Industrial	99.2	2,022.0	+135
Unclassified	28.0	677.5	+4
U. S. Total	$389.0	$8,010.9	+29

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

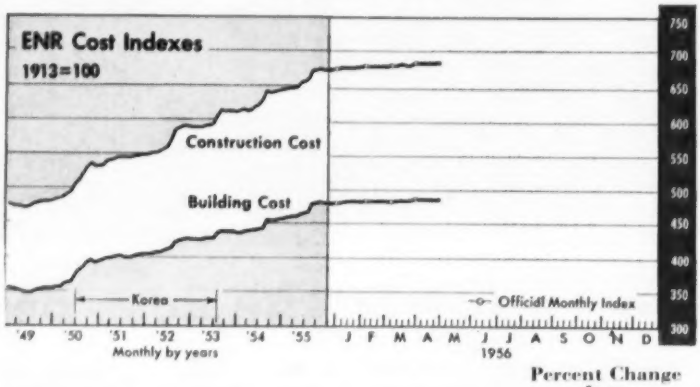
NEW CAPITAL FOR CONSTRUCTION

	Week of Apr. 26	Cum. 17 wks 1956	Chge '55-'56 %
	$ millions		
Corporate Securities	$144.2	$1,139.3	+19
State and Municipal			
All Except Housing	52.7	1,470.0	+14
Housing	...	20.3	−56
Federal Loans	0.4	36.8	+34
Federal Aid	...	...	...
Total Nonfederal	197.3	2,666.4	+15
In U. S.	...	34.4	...
Outside U. S.	...	...	...
Federal Appropriations:			
Total New Capital	$197.3	$2,700.8	+16

Cost Indexes as of Now

ENR INDEXES (1913 = 100), 20-cities' average	April 26 1956	Percent Change from last Month	Year
Construction Cost	683.43	+0.02	+4.6
Building Cost	486.40	+0.2	+5.2

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.845.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.



BUILDING COSTS AND PRICE INDEXES—1949 = 100

	Original Base Year	(F) Feb. '56 (M) Mar. '56 (A) Apr. '56	Percent Change from (D) Dec. '55 (J) Jan. '56 (F) Feb. '56 (M) Mar. '56	Year Ago
Weighted Cost Indexes				
ENR Construction Cost†	1913 = 100	143 (A)	+0.5 (M)	+5.5
ENR Building Cost†	1913 = 100	138 (A)	+0.5 (M)	+5.4
Associated General Contractors	1913 = 100	132 (M)	0 (F)	+4.6
American Appraisal Co.*	1913 = 100	127 (F)	+0.2 (J)	+4.0
Marshall & Stevens, Inc.	1926 = 100	135 (M)	+1.0 (D)	+4.9
† Official monthly indexes for April				
Weighted Price Indexes**				
E. H. Boeckh & Associates, Inc.				
Commercial & Factory	1926–29 = 100	130 (F)	+0.4 (J)	+5.3
Smith, Hinchman & Grylls, Inc.	1926 = 100	136 (M)	+0.3 (F)	+5.5
Contractor Price Indexes				
Aberthaw	1914 = 100	130 (M)	+1.2 (D)	+2.3
Austin	1926 = 100	126 (M)	+2.5 (D)	+8.3
Fruin-Colnon	1926 = 100	131 (M)	0 (F)	+5.5
Fuller	1913 = 100	125 (J)	+1.1 (D)	+4.4
Turner	1939 = 100	130 (A)	+3.5 (J)	+8.9

* Adjusted for estimated productivity. ** Includes overhead, profit; adjusted for estimated productivity.

HIGHWAY BID PRICE INDEXES—1949 = 100

	Original Base Year	First Quarter 1956	Percent Change from Previous Quarter	Year Ago
California Div. of Highways	1940 = 100	115.1	+3.2	+16.0
Colorado Dept of Highways	1949 = 100	80.5	−1.1	+5.4
Idaho State Highway Dept	1950 = 100	124.0*	+4.6	+18.5
Oklahoma State Highway Dept	1940 = 100	110.1	+6.0	+12.1
So. Dakota State Highway Dept	1940 = 100	87.4	−0.1	+22.4
Texas Highway Department	1949–53 = 100	112.0	+1.9	+6.2
Washington St. Highway Comm	1940 = 100	88.6	+2.2	+9.8
US Bureau Public Roads Composite Mile	1925–29 = 100	108.1	+1.0	+3.8
* Index shown is based on 1950 = 100.				

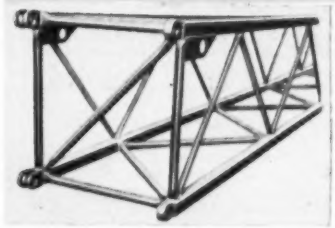
CONSTRUCTION MACHINERY PRICE INDEXES

BLS Indexes of Manufacturer Prices, 1947–49 = 100	Mar. 1956	Percent Change from Last Month	Year Ago
All Types	143.6	+0.1	+7.3
Power Cranes and Shovels	144.4	0	+7.8
Tractors	153.7	+0.1	+8.0
Scrapers and Graders	138.0	0	+6.2
Mixers and Pavers	133.3	0	+5.3
Machinery, Tractor Mounted	146.3	+3.2	+9.0
Specialized Constr. Machinery	133.8	0	+8.9
Portable Air Compressors	133.6	0	+1.2
Air Tools, Hand Held	135.7	0	+8.6

3 NEW LORAIN FEATURES

. . . THAT WILL GIVE YOUR SHOVEL-CRANE ADVANTAGES

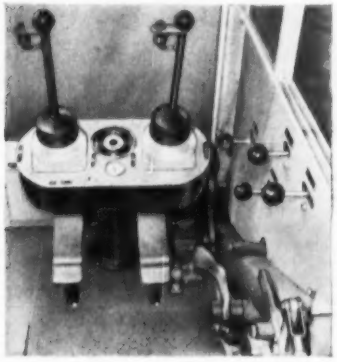
Like Nothing Else In Use Today!



SQUARE TUBULAR BOOM*

Lighter, Longer, Stronger!

Greater strength at reduced weight. Permits increased lifting capacities, working with longer booms, raising longer booms from flat position and traveling with longer booms over the rear.



2-LEVER METERED AIR OPERATION*

Easier, Faster, Simpler!

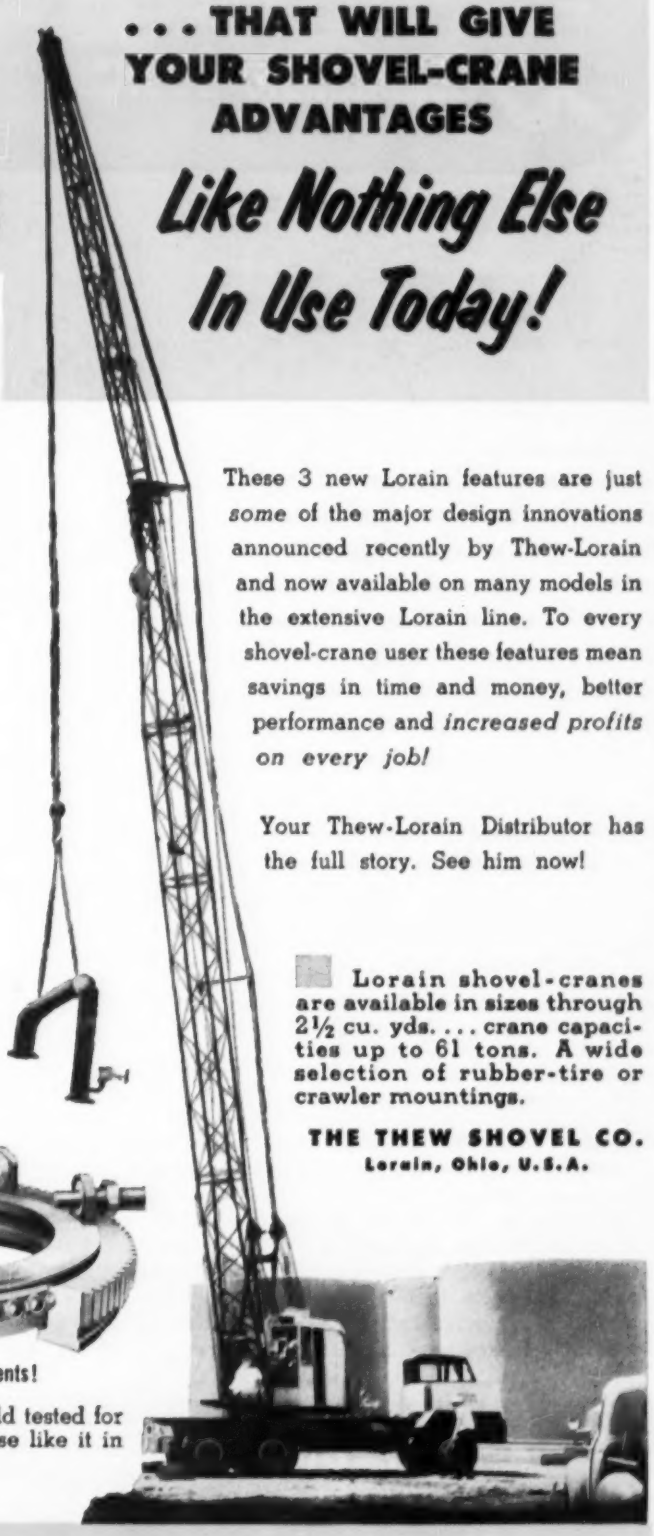
Now, only 2 levers, instead of 3 or 4, for all turntable operations. "Air-Ease" power controls all friction clutches. Reduces operator effort, increases production.

"SHEAR-BALL" MOUNTING*

No Center Pin or Nut, No Rollers, No Adjustments!

Provides smooth, solid "ball-bearing" swing. Field tested for 5 years . . . hundreds in use. There's nothing else like it in shovel-crane use today!

**Not standard equipment on all models*



These 3 new Lorain features are just *some* of the major design innovations announced recently by Thew-Lorain and now available on many models in the extensive Lorain line. To every shovel-crane user these features mean savings in time and money, better performance and *increased profits on every job!*

Your Thew-Lorain Distributor has the full story. See him now!

Lorain shovel-cranes are available in sizes through 2½ cu. yds. . . . crane capacities up to 61 tons. A wide selection of rubber-tire or crawler mountings.

THE THEW SHOVEL CO.
Lorain, Ohio, U.S.A.

THEW-LORAIN®

30 Dependable Sources of Emulsified Asphalt

FROM Maine to the Gulf... from the Atlantic to Iowa... you can be sure of fast, dependable service on asphalt emulsions and mixes by calling any of the McConnaughay Licensees listed at right. This co-ordinated group, guided by a central organization, is made up of experienced manufacturers and contractors who fully understand your problems, offer extensive engineering and testing services on paving materials and mixtures as well as on-the-job advice. Fully equipped to take on complete contracts or provide the laboratory facilities, emulsions and technical services required... they are always ready to work with you closely in solving your problems. Take advantage of this exceptional service. If you are figuring on highway, street, or general paving, get in touch with your nearest McConnaughay Licensee or contact...

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Operating K. E. McConnaughay Emulsified Asphalt Plants

1. Doherty and Swearingen Co.
   53 Main St., *Yarmouth, Maine*
2. Berkshire Asphalt Co., Inc.
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3. James Huggins & Sons, Inc.
   Medford & Commercial Sts.
   Malden 48, Massachusetts
4. C. C. Plumb, Elmwood Station
   P. O. Box 65, *Providence 7, R. I.*
5. C. C. Plumb
   Portland, Connecticut
6. Albany Asphalt & Aggregates
   75 State St., *Albany, New York*
7. Knight Paving Products, Inc.
   1655 Union Rd., *Gardenville, N. Y.*
8. Knight Paving Products, Inc.
   Vine Street, *Ithaca, New York*
9. Knight Paving Products, Inc.
   1980 East Ave., *Rochester 10, N. Y.*
10. Knight-Bitumen Corp.
    Watertown, New York
11. Seaco, Incorporated
    2700 Industrial Drive, *Columbia, S. C.*
12. E. A. Mariani—Emulsified Asphalt
    Hooker's Point, *Tampa, Florida*
13. Pan-Am Southern Corporation
    P. O. Box 2, *New Orleans 6, La.*
    (Also serving Alabama and Mississippi)
14. Asphalt Products Co., Inc.
    Powell Ave., *Nashville 11, Tenn.*
15. Bituminous Materials Co.
    P. O. Box 267, *Terre Haute, Ind.*
16. Wabash Valley Asphalt Co.
    Terre Haute, Indiana
17. Brookman Construction Co.
    17th & Gharkey Sts., *Muncie, Ind.*
18. Fauber Construction Co.
    Lafayette, Indiana
19. Asphalt Materials & Construction, Inc.
    960 E. 22nd, *Indianapolis 2, Ind.*
20. Ready-Mix Asphalt, Inc.
    P. O. Box 882, *Fort Wayne 6, Ind.*
21. Walsh & Ikeler
    R. R. #2, *Gary, Indiana*
22. Bituminous Materials Co.
    416 S. Water St., *Jackson, Mich.*
23. Bituminous Materials Co.
    318 Atlantic St., *Bay City, Mich.*
24. Emulsions, Inc.
    Lawrenceville, Illinois
25. Bituminous Materials & Supply Co.
    415 Maple St., *West Des Moines, Iowa*
    Plants:
26. *Spirit Lake, Iowa*
27. *Iowa City, Iowa*
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29. Emulsified Asphalt Co.
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SPECIFICATIONS OF THESE COLD-MIX PROCESSES AVAILABLE ON REQUEST

1—Penetration Macadam, 2—Open-Graded Plant Mix, 3—Open-Graded Road Mix, 4—Dense-Graded Plant Mix, 5—Dense-Graded Road Mix, 6—Mat Coat, 7—Seal Coat, 8—Sand Mix, 9—Sand Honing, 10—Patching, 11—Mastic-Mix, 12—Driveway Construction.

K. E. McCONNAUGHAY
EMULSIFIED ASPHALT
Plants and Processes
LAFAYETTE, INDIANA

How did some representative firms fare in '55?

Firms	Sales (In Thousands) 1955	Sales (In Thousands) 1954	Earnings (In Thousands) 1955	Earnings (In Thousands) 1954	Profit Margin (Percentages) 1955	Profit Margin (Percentages) 1954
Air Conditioning & Heating						
American Radiator Co.	$339,576	$303,385	$22,634	$20,423	6.7%	6.7%
Minneapolis-Honeywell	244,482	229,401	19,278	15,345	7.9	6.7
Trane	54,061	50,247	3,452	3,403	6.4	6.8
Cement						
Alpha Portland	31,224	29,268	4,788	4,576	15.3	15.6
General Portland	38,906	33,433	8,195	6,833	21.1	20.4
Lehigh Portland	71,054	62,164	11,262	7,959	15.8	12.8
Lone Star	92,198	85,270	14,779	12,626	16.0	14.8
Penn-Dixie	43,064	31,834	6,876	4,854	15.9	5.2
Earthmoving Equipment						
Allis-Chalmers	535,069	492,948	24,805	26,130	4.6	5.3
Blaw-Knox	109,797	101,713	2,444	4,124	2.2	4.0
Bucyrus-Erie	73,005	66,825	6,517	4,542	8.9	6.8
Caterpillar Tractor	523,893	401,041	34,773	25,129	6.6	6.3
Cummins Engine Co.	81,029	59,185	4,522	2,882	5.6	4.9
Gardner-Denver	47,657	31,234	4,873	2,787	10.2	8.9
Thew Shovel	34,748	22,931	1,130	786	3.3	3.4
Lumber						
Georgia-Pacific Plywood	91,966	68,873	6,203	1,794	6.7	2.6
Long-Bell Lumber	105,748	87,741	9,730	3,748	9.2	4.3
Weyerhaeuser	316,732	262,496	49,241	35,510	15.5	13.5
Metals						
Alcoa	848,745	713,004	87,600	61,875	10.3	8.7
Bethlehem Steel	2,096,616	1,656,809	180,191	132,837	8.6	8.0
Jones & Laughlin	696,538	492,941	50,104	25,032	7.2	5.1
Kennecott Copper	555,939	429,131	125,516	77,906	22.6	18.2
Reynolds Metals	384,887	306,778	18,120	17,030	4.7	5.6
U.S. Steel Corp.	4,097,680	3,250,369	370,009	195,418	9.0	6.0
Wallboard & Roofing						
Certain-Teed	135,433	299,791	9,030	5,807	2.7	1.9
Johns-Manville	84,741	253,151	23,511	16,655	8.3	6.6
National Gypsum	249,449	127,950	15,764	13,144	10.5	10.3
Miscellaneous						
Crane	331,421	299,791	9,030	5,807	2.7	1.9
National Lead	533,728	419,333	47,889	36,618	8.9	8.7
Otis Elevator	120,892	118,646	12,242	9,622	10.1	8.1
Pittsburgh Plate Glass	581,966	431,016	61,434	38,638	10.6	8.9
Walworth	51,609	34,896	2,354	−656	4.6	0

Suppliers Boost Sales, Profit Margins

Fed by the biggest construction boom in history, many materials producers and equipment manufacturers last year fattened their sales to record dimensions—and often strengthened their profit margins as well.

And, on the basis of representative first-quarter reports, many of the above companies will do as well—or better—this year than they did in 1955.

Metals producers, for example, started 1956 with a bang. Alcoa's sales in the first quarter were up 11%; net income was up 15%. Reynolds Metals reported a 58% increase in sales for the first three months of this year, as against the same period in 1955, and profits were up substantially. Jones & Laughlin, the nation's fourth ranking steel producer, posted new records in the first quarter for both sales and net income.

Producers in some of the other categories turned in equally impressive reports for the first three months. Johns-Manville sales in the first three months of this year totaled $64.7 million—the biggest first quarter in the company's history. Earnings jumped from $2.7 million for the first

quarter of 1955 to $4.1 million for the first quarter of '56. Blaw-Knox sales of nearly $38 million in the first quarter doubled the $18.5 million for the comparable 1955 period, while net income climbed to $1.4 million.

Allis-Chalmers sales set a first quarter record, although the profit margin dipped slightly. Caterpillar Tractor set new records for sales and earnings. Minneapolis-Honeywell posted higher sales and profits. Thew Shovel more than doubled its earnings in the first quarter in comparison with the same period in '55. And, National Lead increased its earnings 37% in the first quarter, while its sales were up 20% over the first three months of 1955.

• **Fewer companies, more products**—The construction industry's phenomenal demand for materials and equipment plays a big part in the current prosperity of the suppliers. This is the major factor in the rising sales curves; and it is a lesser factor in the improved earnings picture. But demand alone is not a complete answer.

Suppliers' cash registers are ringing up new records because of increased sales of established products, sales of new products, developed in the past year or two, and because of mergers, which often enabled companies to diversify their lines quickly and competitively.

If the representative firms shown in the table are a fair sample, the construction industry must have witnessed more supplier mergers in 1955 than in any year in recent history. Of the 32 companies listed, 15 were involved in mergers last year. For another on the list, Long-Bell Lumber, a merger with International Paper Co. seems imminent.

While the immediate effect of these mergers is to boost total sales, profit margins tend to lag because of administrative costs involved in absorbing a new company, integration of products, with expensive retooling, and certain production problems. This is particularly true of the mergers in the equipment field.

• **Profits pay for expansion**—The 1955 report on five representative cement producers shows that this group is able to pay for its big expansion programs to a large extent from retained earnings. As a group, the cement producers seem to top all other categories on their profit margins, with percentages ranging from 15.3% up to 21.1%.

Lehigh Portland Cement is a good example of the expansion-minded cement companies. By the end of this year, Lehigh's post-war construction expenditures will total $110 million, representing an increase of 41% in production capacity since 1945. To pay for this, Lehigh—like many other cement companies—will continue to rely heavily on retained earnings and depreciation reserves. These retained earnings add up quickly. Lehigh, for example had a profit margin last year of 15.8% on sales of more than $71 million.

The metals producers also showed a good profit on their record 1955 sales. Top profit margin was Kennecott Copper's 22.6% (on sales of almost $556 million). But this reflected sometimes chaotic conditions in the world copper market which led to a series of price increases for U.S. copper. These conditions drove the U.S. price of copper to the highest level since Civil War days.

Aluminum makers did well, but there was a wide swing between Alcoa's hefty 10.3% profit margin and the 4.7% reported by Reynolds Metals. The steel companies, operating in a market of peak demand, maintained their profit margins at levels from 7% to 9%.

No consistent earnings pattern showed up among the equipment makers. While all of them had higher sales than in 1954, the profit margin was down for two, while a third was almost even with 1954. Blaw-Knox, caught in a switchover from defense work to civilian production, saw its profit margin whittled from 1954's 4% to 2.2% last year. (In 1954, 58% of its net income came from defense work; in 1955, only 20% came from this work.)

In many other categories, companies apparently had succeeded in keeping costs in line even though they were rapidly expanding their sales. Profit margins tended to match the preceding year—and in a large number of cases to exceed 1954.

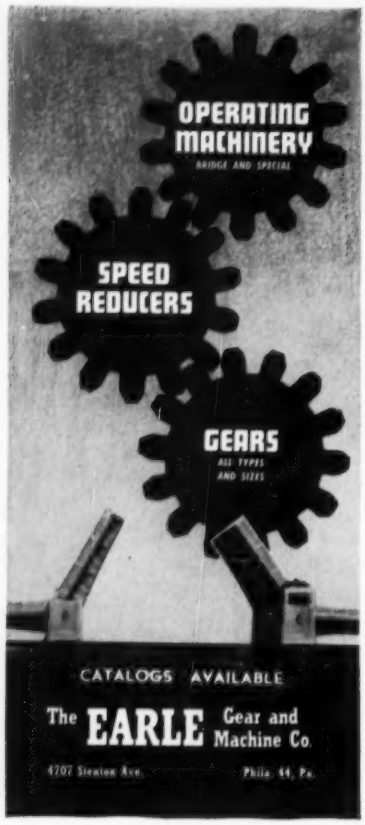
If they can continue this pattern, 1956 will be a good year indeed for the suppliers.

New York Approves Aid For Flood Repair Work

New York State has announced approval of the first 124 flood damage repair projects declared eligible for state aid under the $1.5-million Emergency Flood Repair Bill signed by Gov. Harriman in mid-April.

Communities seeking state funds for repairs to local flood-damaged public works have until May 15 to submit their requests.

(*B&F continued on page 105*)



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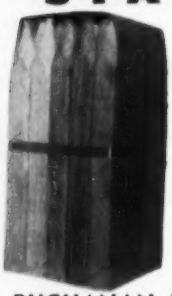

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	–18"	11.50 10.50
	–24"	16.00 14.50
	–36"	24.00 22.50
⅝"x1¼"	–12"	6.15 5.60
	–15"	6.60 6.00
	–18"	7.50 6.50
	–24"	11.00 10.00
	–36"	16.00 14.00

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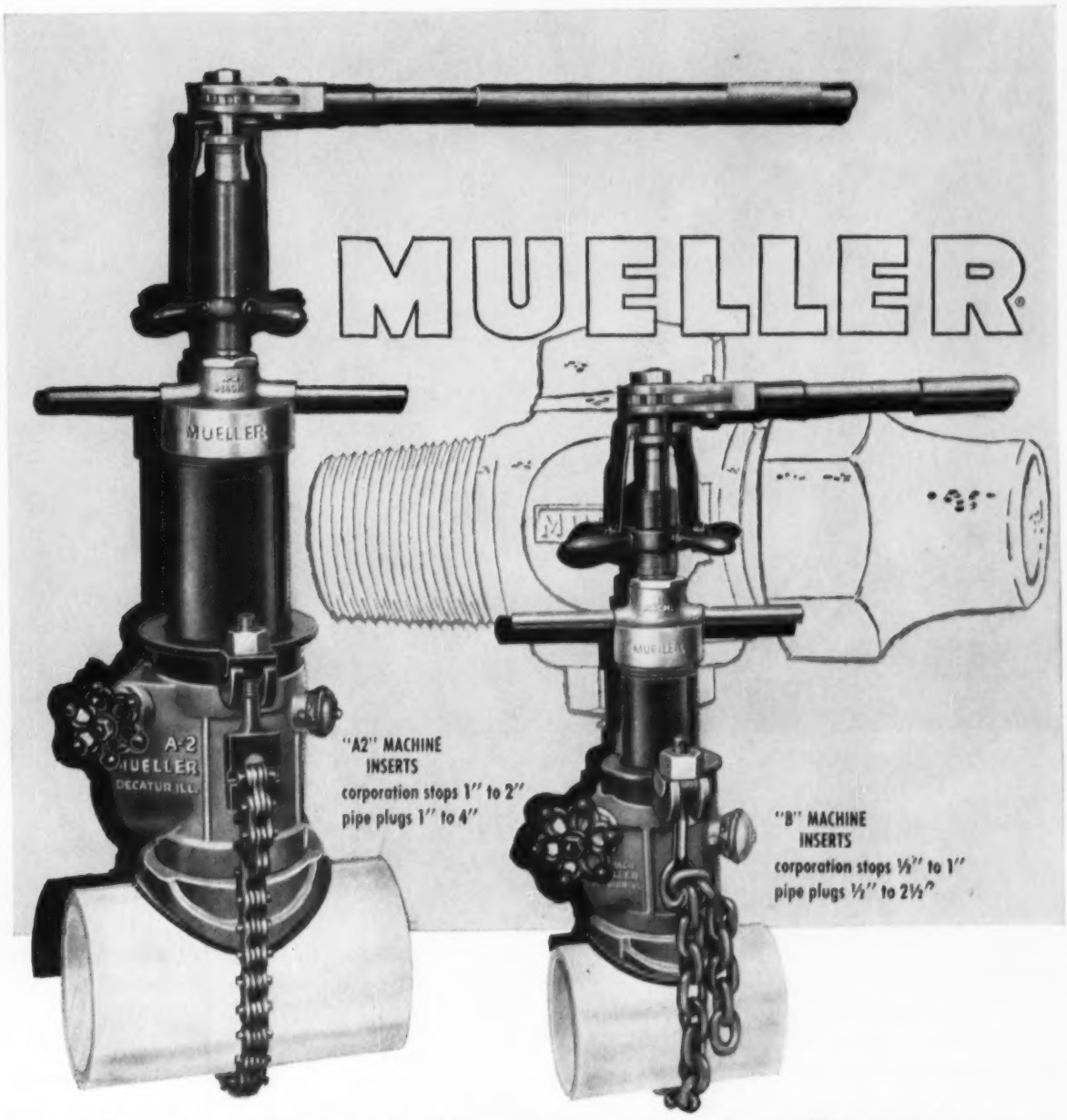

Insert Corporation Stops Under Pressure

Drill the main, tap the hole and insert corporation stops with the Mueller "B" or "A-2" Tapping Machine. Or you can use them to remove and replace old corporation stops or insert pipe plugs—*all under pressure.*

Drilling and tapping operation are done simultaneously with a combined drill and tap. Both machines use a single boring bar for drilling, tapping and inserting operations. This assures accurate alignment for inserting the stop—eliminates the possibility of cross-threading.

Combination by-pass and test valve relieves pressure and permits operator to check for leakage after stop is inserted and before machine is removed.

Refer to Mueller Catalog W-96, contact your Mueller Representative, or write direct for complete information.

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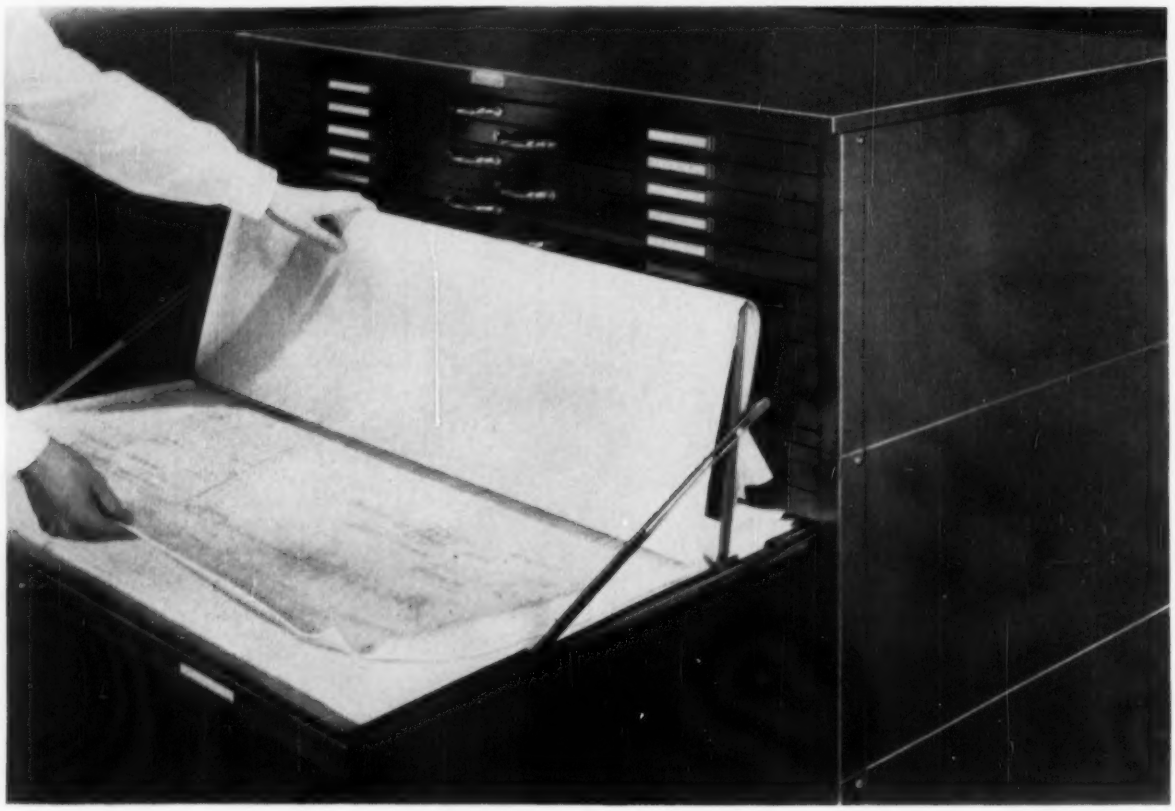
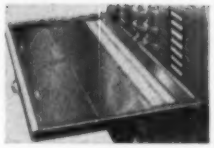


1000 tracings...all easily accessible ...in 15⅜ inches!

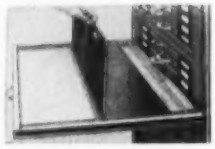
This Hamilton Shallow-Drawer unit, only 15⅜" high, safely stores 1000 of your most active tracings. Yet you can easily remove and refile any one of them because of the exclusive *tracing lifter* in each drawer.

Hamilton builds outstanding units for every storage need. Many units interlock in a single, compact UnitSystem to give you a variety of special purpose filing units in a single-bank assembly. See your Hamilton dealer or write for complete UnitSystem information.



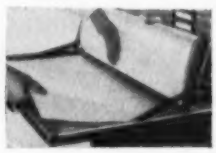
Keeps contents flat

Each drawer has a mechanical tracing lifter that also keeps contents flat when drawer is closed.



To find drawing

Raise front half of tracing lifter and locate desired drawing. Rear half still holds contents firmly.



Removing sheet

Sheets above desired drawing are turned over lifter and folded back. Sheet is easily removed.

Refiling sheet

Drawing is refiled as easily as removed—flat and smooth, ready for many future references.

Many Hamilton units (5-Drawer, Shallow-Drawer, Vertical Drawer) interlock into a single UnitSystem installation—building storage space *upward*, saving floor space. UnitSystem equipment is available in sizes to fit your filing requirements.

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New Record Seen

Waterworks contracts top $100 million in 4 months

Contract awards for waterworks projects (reservoirs, pumping stations and distribution lines) totaled more than $100 million at the end of April, 18% ahead of the comparable four-month period in 1955.

From all indications, contract awards for waterworks this year should set a new record, well above the $314-million total for last year. The figures for the first four months lend substantial support to ENR's earlier forecast of a record volume of $350 million in awards this year, up 11% over 1955 (ENR Feb. 16, 1955, p. 56).

Pickup in waterworks activity in 1955—and so far this year—shows a marked contrast with earlier periods. Waterworks projects did not share in the construction boom as rapidly as other types of construction in the postwar period.

Waterworks awards slumped to low points during World War II—even lower than the depression levels of the 1930s. It wasn't until 1948 that contract volume reached $200 million a year, and 1955 was the first time that awards broke through to the $300-million mark.

Part of the credit for the current boom in waterworks projects undoubtedly can be traced back to the severe, widespread water shortages of 1953 which caused many municipalities to take another look at their water supply problem.

An estimated 1,000 cities were affected by water shortages in 1953. Many of the towns were rated as medium-size in population, and a large number of them faced rapid growth.

The soaring population growth since the war plus the mass movement to the suburbs combined with increased per capita demand for water to place a heavy load on water supply facilities in community after community.

• **Proposed projects increase**—With this background in mind, it is not surprising that ENR's backlog of proposed waterworks projects zoomed up to the $2-billion level at the end of 1955, climbing 20% in a year. And, in the first quarter of 1956, some $114 million in additional projects went into the hopper of future work. This volume was 71% greater than in the same period in 1955.

Trends in waterworks construction

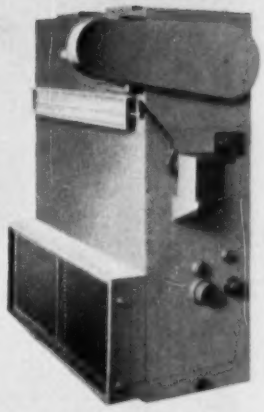
(*Continued on* page 108)

"Buffalo" units maintain air comfort in our "ATLANTIC WATCH TOWERS"

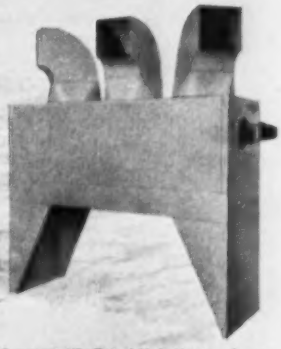
This radar-equipped Tower, standing continuous long-range lookout over the Atlantic, takes a lot of rough weather — yet it's always comfortable inside. 19 dependable "Buffalo" Air Conditioning and Heater Units see to that.

The "Buffalo" Heaters warm the fresh air drawn in from outside for the living quarters; while the "Buffalo" Cabinets maintain accurate temperature control and clean, filtered air in the radar control room.

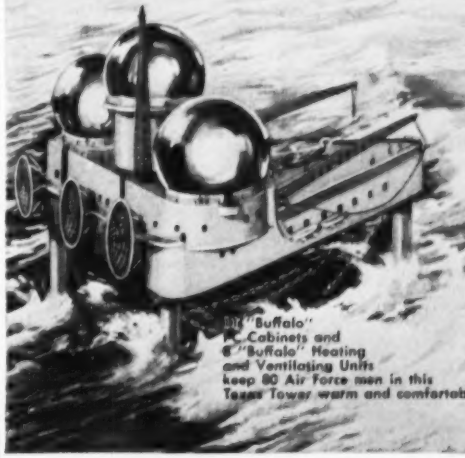
You'll find "Buffalo" Units like these doing important "climate" jobs in every type of plant, store and public building — heating, cooling, ventilating, controlling humidity, filtering or washing air — and doing it with complete reliability. For any air handling or processing job you have, look to "Buffalo". Air has been our business for 79 years.



"Buffalo" PC Cabinets provide any desired combination of air conditioning functions. Write for Bulletin 3703.



Compact "Buffalo" Unit Heaters have built-in fans and swivel outlets. Write for Bulletin 3704.



"Buffalo" PC Cabinets and 6 "Buffalo" Heating and Ventilating Units keep 80 Air Force men in this Texas Tower warm and comfortable.

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Tiger Brand Wire Rope helps build

Littleton Development required the movement of 4 million cubic yards of earth with shovels and scrapers which used a considerable amount of Tiger Brand Wire Rope in the process.

Tiger Brand Wire Rope does the work quickly and at low cost. Hoist ropes are built with the best combination of strength, flexibility and abrasion resistance to assure long life.

Facts about the Littleton Development

Built by the New England Electric System as part of the Connecticut River Power Company Development.

Engineers: Ebasco Service, Inc., New York City, designers of dam and powerhouse and supervisors of construction of both. *Contractor for preparing site, building diversion channel and earth dam:* B. Perini & Sons Company, Farmingham, Mass. *Contractor for the concrete work:* Morrison-Knudsen Company, Boise, Idaho.

Pouring 400,000 cubic yards of concrete means the crane's hoist ropes take a lot of punishment. Standard Tiger Brand Rope was used in this operation.

The new "Samuel C. Moore Station" of the New England Electric System shares honors with Camerford as the two largest hydro stations in New England.

The rating of the station will be 150,000 kilowatts. The height of the dam is approximately 165 feet. The size of the lake impounded is the largest on the Connecticut River, 11 miles long and covering 3500 acres.

To build this dam, the contractors had to move approximately 4,000,000 cubic yards of earth and pour about 400,000 cubic yards of concrete. The concrete was hauled about a mile to the job in 4-cubic-yard buckets. These were hoisted from the truck to the position on the dam by cranes and the concrete was dumped into the forms.

The contractor for the concrete work was Morrison-Knudsen Company, Boise, Idaho, and the contractor for preparing the site, building diversion channel and earth dam was B. Perini & Sons, Framingham, Mass.

Both contractors used large quantities of American Tiger Brand Wire Rope. It is interesting to note that all the wire rope needs for this job could be supplied from the standard types of Tiger Brand Rope.

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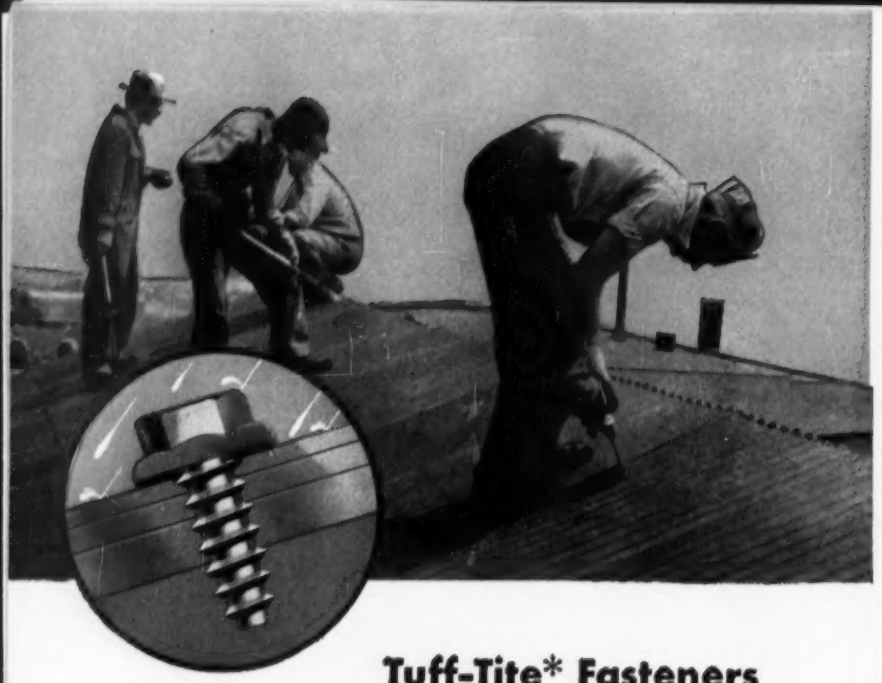
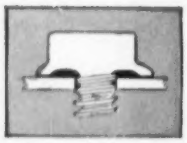


Tuff-Tite* Fasteners Give You Quick, Safe, Economical, *Leakproof* Construction



Neoprene washer trapped under head seals hole — acts as cushion.

Roofs and side walls go on quickly and are *leakproof* when metal or plastic sheets and panels are applied with Tuff-Tite fasteners.

This unique fastener has a one-piece metal head and a preassembled neoprene washer. When Tuff-Tite is tightened, the neoprene washer is trapped and controlled by an undercut in the washer head. The neoprene is forced into the hole and around the threads to form a watertight and airtight seal. Leaks between the head of the screw and the metal washer are impossible because they are made as one piece.

Tuff-Tite fasteners also provide tight seating without cracking or chipping porcelain enamel, plastics and other fine finishes. They are available as tapping screws, thread cutting screws, drive screws, machine screws, stove bolts, wood screws and special fasteners. They are made of carbon, alloy and stainless steel, aluminum, brass and other metals in a variety of head styles.

To learn more about how Tuff-Tite can give you leakproof, economical fastening, use the coupon below.

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sometimes are difficult to spot because most of the jobs are comparatively small in dollar amount and occasional big jobs have more effect on the overall volume than in some other types of construction.

However, an analysis of awards in 1954, 1955 and the first four months of 1956 indicates some noteworthy regional trends.

New England, for example, which has had a two-year downtrend in waterworks projects, shows an even sharper drop-off in the first four months of this year.

The Middle Atlantic region, which made a spectacular gain in 1955 (up 147% over 1954) is currently showing a 156% increase over last year. Although this rate may drop later in the year, the regional contract volume for 1956 should be well above 1955.

The South is bouncing back from a sharp decline in last year's volume and will probably finish the year close to the 1954 level.

Middle West states aren't reporting as much contract volume this year as in 1955, but the year's total should be high, probably topping the 1954 mark.

While the West of the Mississippi region is a little behind last year, it is still the second best year for the region and could pull ahead to set a record.

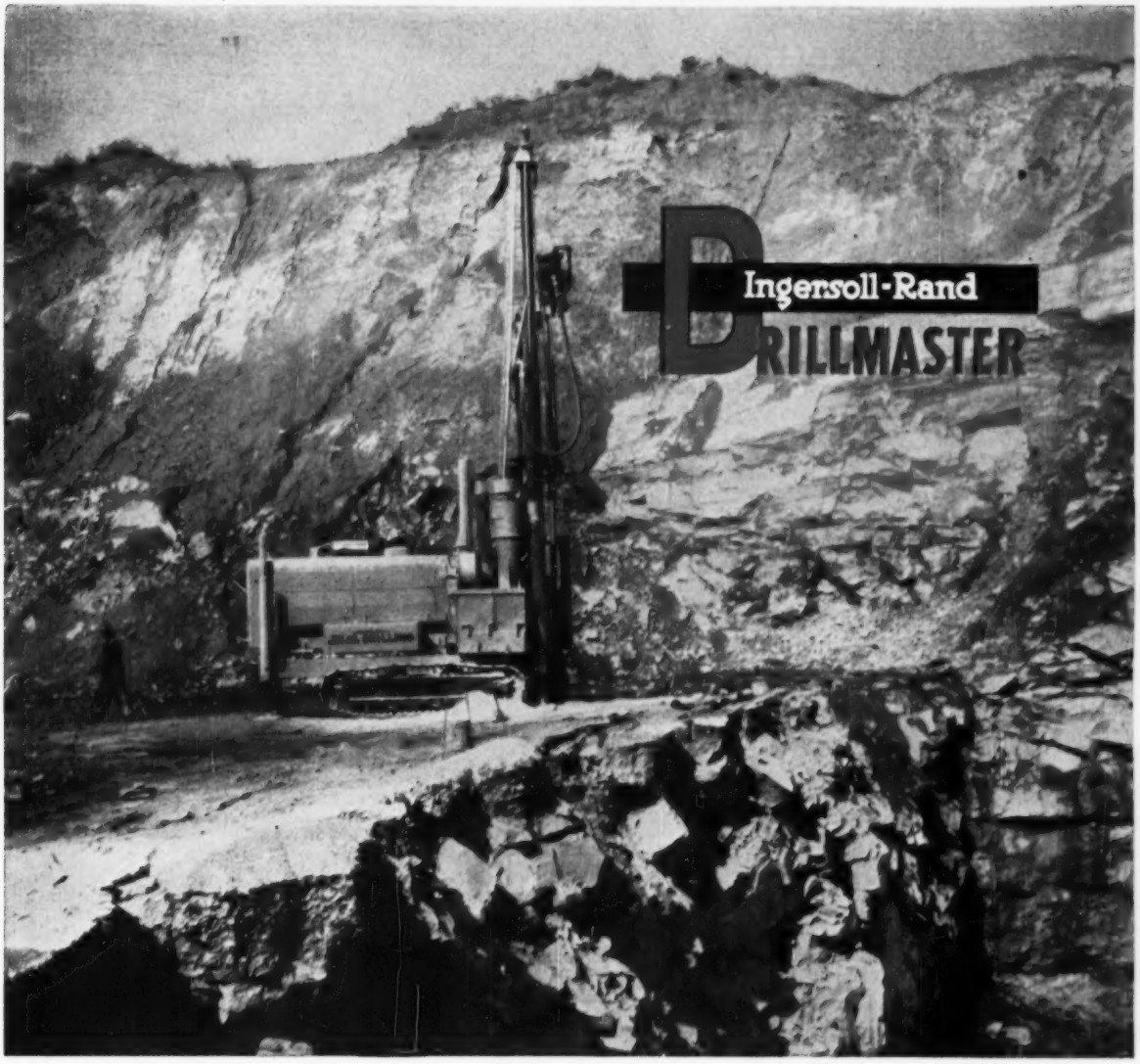
The Far West is climbing steadily and the volume of contract awards seems to be gaining momentum this year.

• **Pennsylvania leads states**—On a state-by-state basis, Pennsylvania takes the honors with $14.7 million in contracts let in the first quarter, up an incredible 678% over the same period in 1955. Bethlehem, Pa., awarded a $4.7-million contract in March and Philadelphia came through a $3.7-million project. The Pennsylvania total accounted for a major share in the $21.3 million in contracts reported for the Middle Atlantic region in the first quarter.

Out West, where water ranks close to oil as a precious commodity, Texas leads in the total volume of waterworks construction. Last year, Texas topped all states with nearly $47 million in waterworks contracts. This year, it has already rung up $9.7 million, a 17% increase over the comparable 1955 period.

Texas also leads the way in planning future waterworks projects. At the end of March, Texas had a total of $357 million worth of proposed

(*Continued on page 110*)



4032 GROSS TONS PRODUCED DAILY!

SUPPLYING BLAST HOLES for three different quarries, the "down the hole" Depthmaster drill of the DRILLMASTER shown above is drilling limestone at a rate never before thought possible.

The formation is hard and very abrasive. Yet on a 50-foot face, the operator is sinking 180 feet of 6-inch holes per shift—on a 15-foot hole spacing pattern and 18-foot burden. That represents 4032 gross tons a day!

The Depth-Master "down the hole" drill actually goes down the hole with the bit. Applying full drilling impact directly to the bit, it eliminates the power losses in long drill steels. You can use the three-way DRILLMASTER also as a Rotary drill or as a Power-Master "out of the hole" drill.

Complete DRILLMASTER tower and accessories are available for tractor or truck mounting. For further details, write for Bulletin 4179.

5-387

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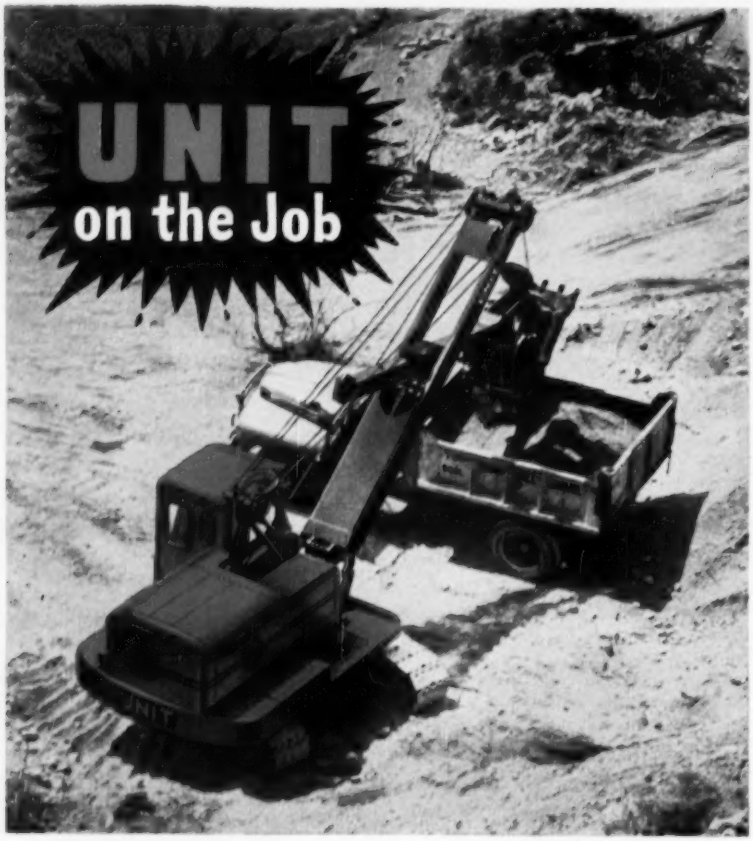

SWING SPEED makes PAY LOADS!

Here's a UNIT ½ Yard Shovel doing a PRODUCTION DIGGING JOB in a gravel pit. UNIT owners like the ease of operation and the FULL VISION CAB for complete visibility. They also like the sturdy construction and the many mechanical features, plus the ECONOMICAL PERFORMANCE and LOW UP-KEEP which all add up to EARNING POWER. Why not investigate what UNIT can do for you — on YOUR next excavating and material handling job?

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A 7147-2/3-PC

waterworks projects, up 9% over a year ago.

Ohio has constructed more than $20 million worth of waterworks projects in each of the past two years (almost double the 1953 rate) and 1956 is expected to come close to last year's volume, even though the first quarter lags 11% behind 1955.

Ohio also has a substantial backlog of waterworks projects on the planning boards ($115 million) with proposed work piling up faster than contract awards are being made.

California, which ran third in waterworks construction last year, has started off in 1956 with a comfortable 15% gain over 1955. More significant is the fact that California's backlog of proposed projects has doubled in one year and now stands at $120 million.

New York's contract volume is ahead of last year and the Empire State also has the second biggest backlog of proposed work.

With the traditional leaders doing well—and some big waterworks programs under way in cities like Denver, Colo. and Chicago—1956 promises to be a record year.

Money Squeeze

Bridge bond bid rejected, other issues withdrawn, as borrowers feel impact

Construction last week felt some of the direct effects of the drum-tight money market.

The high cost of borrowing was spotlighted in Tallahasee, Fla., where the Florida Development Commission rejected the lone bid submitted for $5.5-million Sarasota County Bridge revenue bonds. The single bid quoted a net interest cost to the commission of 4.998%, considered by the agency to be from ¼% to 1% too high. No date was set for a reoffering.

Other prospective borrowers have dropped out of the market, at least temporarily. The New York State Power Authority, for example, postponed indefinitely the sale of $7.2 million worth of bonds originally scheduled for last week.

Those who have gone ahead with bond sales have paid a high price for the money they need. The State of Ohio sold $50 million worth of revenue bonds (carrying a high-grade AAA rating by Moody's) with a net interest cost of 3.093%, well above two similar offerings made in the past.

Proceeds of the $50-million Ohio bond sale will provide funds for

acquisition of rights-of-way, as well as money for construction and reconstruction work on some of the state's main routes. It's the third series of bonds to be marketed under a $500-million program authorized by the voters in 1953. The state sold $30 million worth of these bonds in 1954, and another million in 1955.

Another example of the financing squeeze was the Wisconsin Electric Power Co.'s sale of $30 million worth of 30-year bonds to help finance its big construction program.

Interest rate for the utility's borrowing was 3.815%—even higher than the borrowing costs posted for Southern California Edison Co. the previous week on a similar issue. Southern California—for one week—had the unfortunate distinction of paying the highest interest on such financing since the early 1930s (with the exception of a few weeks in 1955).

Although the bond market expected to resell the Wisconsin utility issue to investors with comparatively little trouble, most bond men agreed that the market is still weak.

Despite the exceptionally high yields right now, there has not been any heavy flow of investment money in the bond market. However, the rising yields, according to some municipal bond experts, probably will tempt insurance companies, pension funds and foundations so that the supply of money will show some improvement.

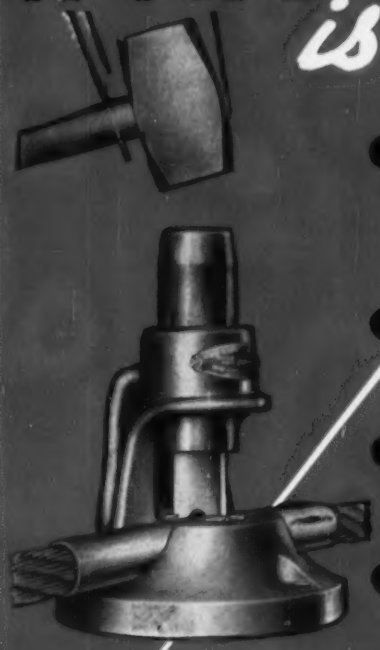
But the high interest rates that would bring these investors into the municipal market heavily would also keep some would-be borrowers out of the market. That would mean that some more public works projects will be deferred indefinitely.

Business Briefs . . .

• **New name**—Underscoring the growing importance of its construction machinery line, which includes crawler tractors, scrapers, bulldozers, tractor-shovels, engines and off-highway trucks, International Harvester announced a significant name change. From now on, its former Industrial Power Division will be known as the Construction Equipment Division.

• **Expand equipment output**—Eimco Corp. will spend $1.5 million at its Salt Lake City, Utah, plant to step up its production of prime movers for earthmoving. By the end of this year, Eimco's assembly line will be turning out Model 105 crawlers at the rate of 65 a month, according to company officials.

Cutting WIRE ROPE is easy



● **FAST** Especially designed cutting blade and dies assures fast cutting action. The hammer principle eliminates any special skill requirements.

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● **SAFE** The enclosed cutting blade locked in the body of the cutter assures perfect safety.

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Building Trades Stall State Mergers

United action follows on heels of failure to settle deep jurisdictional conflict with industrial unions

The AFL-CIO building trades opened another schism in labor unity last week by vigorously defending its jurisdictional claim to construction work performed in industrial plants.

Adopting a challenging course of action unprecedented in the short history of labor's new federation, affiliates of the Building and Construction Trades Department instructed their local unions to oppose further AFL and CIO mergers on the state level until a satisfactory solution is reached with industrial unions on the jurisdictional issue. The question involves union jurisdiction over maintenance workers as well as work jurisdiction over in-plant construction normally performed under contract.

The action—in the form of a resolution signed by the presidents of 18 of the department's 19 international unions—was taken on last Thursday at a special meeting called after a two-day session of the joint committee of the Building Trades and Industrial Union Departments had failed to come up with a solution.

Adoption of the resolution fulfills the department's earlier assurances that it would stand fast on its jurisdictional claims and poses for the new AFL-CIO a problem far more fundamental than the one raised by the controversial ILA-Teamster alliance. Although the ILA pact—involving the possible expulsion of the teamsters—perhaps was made academic last week with ILA's offer to withdraw from the alliance, the AFL-CIO Executive Council was still expected to meet this week.

• **Test of resolution**—Here's how the building trades' resolution reads:

"Whereas, the AFL-CIO constitution provides in Article III, Section 5, that the AFL-CIO state and local bodies shall merge within two years after December 3, 1955; and

"Whereas, this two-year period was specified so as to allow time to effect agreement on such vital questions as jurisdiction; and

"Whereas, it was our understanding that the jurisdiction of the trades affiliated with the Building and Construction Trades Department would be preserved as granted by the AFL, and

"Whereas, a committee of the Building and Construction Trades Department and Industrial Union Department has been meeting to reach an understanding and agreement on jurisdiction; and

"Whereas, the industrial unions now appear to hold to the position that they have the right to install and service construction materials which industrial union employees manufacture; and

"Whereas, the industrial unions now appear to hold to the position that they have the right to do construction work when such construction work is an extension of industrial plant operations,

"Now therefore be it resolved:

"(1). That each international building and construction trades union signatory hereto reaffirm its position in favor of labor unity.

"(2). That each international union president signatory hereto will instruct by wire or letter all of its local unions to use every facility at their command to postpone merger of the AFL and CIO state and local central bodies until such time as a satisfactory written understanding on jurisdiction is reached between the Building and Construction Trades Department and the Industrial Union Department and until such agreement is approved by the AFL-CIO Executive Council and/or by AFL-CIO convention action.

"(3). That the president of the Building and Construction Trades Department is instructed to forward a copy of this resolution to all state and local Building and Construction Trades Councils."

The resolution was signed by Richard Gray, President; Frank Bonadio, secretary; and the international presidents of all the building trades except the bricklayers' Harry Bates, who has been attending the union's annual apprenticeship contest in Seattle (see page 21).

• **Background**—Through its forthright action, the department has brought into the open the deep-seated conflict between craft and industrial unions that gave birth to the CIO in 1935. Raised by the plumbers last October, the issue was the major threat to the December merger of the AFL and CIO (ENR Dec. 1, 1955, p. 21) and has since remained the knottiest—and perhaps the key—problem facing the new federation. It's also one of the big roadblocks to the pending drive for AFL-CIO membership.

Unsuccessful pre-merger efforts to arrive at a satisfactory working agreement between the building trades and the CIO unions—which formed the nucleus of the new IUD now headed by Walter Reuther—led to the formation of the joint committee to seek solution to the jurisdictional conflict between the two departments.

So far, the life of the committee has been one of failure. Inability to agree on any formula led to patchwork compromises in the UAW disputes at Studebaker-Packard's Detroit plant and at the Chevrolet plant in Cleveland. Since then, an operating engineers' dispute with UAW over powerhouse employes at North American Aviation's Columbus, Ohio, plant has gone to the NLRB, which has authorized a severance election from UAW.

Grave concern over the solution to the problem was expressed by the AGC at its annual convention in February, when it strongly reaffirmed the principle of construction by contract and vigorously opposed any compromise of the principle. And at both the building trades' legislative conference and at the recent annual convention of the New Jersey Building and Construction Trades Council, President Gray made it clear that the building trades would steadfastly adhere to their traditional claims.

• **Stalemate**—It was against this background that the 14-man joint committee met for two days last week in its first serious—but again unsuccessful-attempt to end the feud. After breaking up in disagreement, the committee said it intended to hold further meetings and "to make a sincere effort to formulate" rules that would be "fair" to unions of both departments.

By opposing merger on the state level, the building trades have struck at the heart of the united labor movement. Speaking at the Missouri merger last month, AFL-CIO President George Meany said merger on the national level was only a beginning and that the "real merger must proceed in the states and the cities, until we are welded into one compact organization." So far, state mergers have been completed only in Arizona, Arkansas, Tennessee, Louisiana and Missouri.

OFFICIAL PROPOSALS

Bids: May 10, 1956.

Delaware River Port Authority Administration Building Camden, New Jersey

POLICE BUILDING—ELECTRICAL WORK—GLOUCESTER APPROACHES WALT WHITMAN BRIDGE CONTRACT NO. G-7D

Sealed bids will be received for the Police Building Electrical work, on the Gloucester Approaches of the Walt Whitman Bridge, known as Contract No. G-7D, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey until 2:30 P. M. Eastern Daylight Time, May 10, 1956, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of a $10.00 check which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $200.00 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania, or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO,
Executive Director

Bids: May 29, 1956

Department of Streets Philadelphia, Pennsylvania Procurement Department

SEALED PROPOSALS WILL BE RECEIVED AT ROOM 313 CITY HALL ANNEX, UNTIL 2:30 P. M. EASTERN DAYLIGHT SAVING TIME ON TUESDAY, MAY 29, 1956 AND OPENED AT THAT TIME IN ROOM 313 CITY HALL ANNEX.

Bid No. 3775—
Bridge Construction
for
Henry Avenue over Green Lane
and
Henry Avenue over Gorgas Lane

NOTICE:
No bid for this work will be received unless the questionnaire with all questions fully answered is filed with the Street Commissioner, Room 904, City Hall Annex, at least one (1) week previous to the date of opening bids.

Proposals may be obtained at Room 1012, City Hall Annex.

The form of contract and bonds may be obtained at Room 715, City Hall Annex.

Michael H. Sura,
Procurement Commissioner

Bids: May 22, 1956

Contract BT-120.008

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY BUS TERMINAL
ALTERATIONS FOR
CLINTON TRUST CO.

Sealed proposals for the performance of interior alterations for a branch bank in the Port Authority Bus Terminal at 40th Street and Eighth Avenue, New York City, will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, Mar 22, 1956, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF
NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, May 3, 1956

U. S. Government

United States Department of Commerce, Bureau of Public Roads, April 26, 1956. Sealed bids will be received at the Inter-American Highway Office, Bureau of Public Roads, Room 4069, General Services Building, Washington 25, D. C., until 2 p.m., e.d.t., June 1, 1956 for the construction of approximately 56 miles of highway, including one major bridge, on the Inter-American Highway in southern Costa Rica, identified as Costa Rica Project 75-56-4. The project begins at the Platanares River about 140 miles southeast from San Jose and ends at a Ballast Pit approximately 25 miles southeast of Palmar. The project is isolated and prospective bidders are requested to arrive in San Jose, Costa Rica, prior to May 10, 1956 in order to join a scheduled group inspection of the work. Details of group inspection trip will be furnished as a part of the plans. The approximate quantities of the major item are as follows: 4,300,000 cu. meters Unclassified Excavation, 230,000 tons Crushed Gravel or Stone Base, 10,300 cu. yds Concrete Class "A" (culverts), 1,115,000 lbs. Reinforcing Steel (culverts), 17,500 cu. meters Cement Rubble Masonry, 22,000 lin. ft. Bituminous Coated Nestable Sheet Metal Pipe Culvert (24" to 48"), 1,000 cu. yards Concrete Class "A" (bridges) 2,000 cu. yds. Concrete Class "B" (bridges), 350,000 lbs. Reinforcing Steel (bridges) 1,700,000 lbs. Structural Steel (bridges). Bids will be accepted only from United States or Costa Rica firms with a satisfactory record of performance in the United States or Costa Rica. Plans, Specifications and Proposal Forms are available upon request at the address given above or from the District Engineer, Bureau of Public Roads, Fifth Floor, Hotel Costa Rica, San Jose, Costa Rica, C.D. Curtiss, Commissioner.

GOVERNMENT OF IRAQ, MINISTRY OF ECONOMICS, TOBACCO MONOPOLY ADMINISTRATION. Construction of Tobacco Warehouses. 1. The Iraqi Tobacco Monopoly Administration invites tenders for the construction of Tobacco Warehouses to be erected at Baghdad and 16 other locations north of Baghdad, all in accordance with the specifications, schedules, drawings and addenda. The work to be performed is briefly as follows: Preparation of sites, making foundations, and walls, erection of 30 steel frame warehouses with corrugated metal roof & sides, installation of electrical & water services, installation of humidification equipment where required, and building of housing accommodation at each site. 2. Copies of the documents for tender may be inspected at the following addresses on or after 10 April, 1956: a) The office of Director General, Tobacco Monopoly administration, Baghdad, Iraq. b) Iraqi Embassies in Washington, London, and Paris and Iraqi Legations in Bonn, Brussels, and Rome. c) Offices of the consultant, Tippetts-Abbett-McCarthy-Stratton: Alwyiah, Baghdad. 5 Merlin Street, P.O. Box 42, Athens, Greece. 62 West 47th Street, New York 36, N. Y., U.S.A. 3. Copies of the documents for tender may be obtained on or after 10 April upon the payment of ID. 20/—or the equivalent per copy at the offices mentioned in (a) and (c) of Article 2 above. Additional copies of the General Conditions & specifications could be obtained on payment of ID. 10/— per copy. 4. The tender shall be in English and must be accompanied by preliminary deposit of ID. 1600/—or the equivalent, either in cash or by Letter of Guarantee from a Bank in Iraq per each warehouses. No tenderer shall be asked for preliminary deposit in excess to ID.10,000 being the Maximum required. 5. Tenders shall be enclosed in a sealed package and endorsed clearly on the outside with the words, "TENDER FOR THE CONSTRUCTION OF TOBACCO WAREHOUSES." They shall be addressed to the Tobacco Monopoly Administration, Baghdad, and delivered to the Director General on or before 12 noon, Baghdad time, 20 June 1956. If sent by post, the tenders shall be registered but the tenderers must assure themselves of delivery to the Directorate General in due time. 6. Tenders not submitted in time specified or not accompanied by receipt of the deposit or by Letter of Guarantee will not be considered. 7. During the period of time allowed for tender, the Director General reserves the right to amend the documents for the purpose of clarification or to reflect modifications in the design or in the contract terms. Any such amendments will be in the form of formal addenda distributed to the prospective tenderers. 8. The Tobacco Monopoly Administration Board does not bind itself to accept the lowest, or any tender. TOBACCO MONOPOLY ADMINISTRATION. BAQIR H HASANI, DIRECTOR GENERAL AND CHAIRMAN OF BOARD OF DIRECTORS.

Department of Commerce, Bureau of Public Roads, April 20, 1956. SEALED BIDS will be received at the office of the Bureau of Public Roads, First National Bank Building, Florence, Alabama, until 10:00 a.m., C.S.T., MAY 25, 1956, for Project 3H14, 16, 17, 18, 20, Natchez Trace Parkway, Choctaw County, Mississippi. Five reinforced concrete bridges, two concrete box culverts, and approaches. Aggregate length: 0.258 mile. The approximate quantities of the more important items are as follows: 40,000 cu. yd. Excavation and Borrow, 3,055 cu. yd. Concrete, 447,650 lb. Reinforcing Steel, and 8,900 lin. ft. Treated Timber Piles. Minimum wage rates have been fixed as required by law. Plans, specifications, and proposal forms are available upon request at the address given above, or Bureau of Public Roads, 1440 Columbia Pike, Arlington 4, Virginia. H. J. Spelman, Division Engineer.

Department of Commerce, Bureau of Public Roads, April 23, 1956. SEALED BIDS will be received at the office of the Division Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., D.S.T., MAY 22, 1956, for Project 1A4-B12-D11-E4, Colonial Parkway, York and James City Counties, Virginia. Paving and other work from Ballard Creek to Yorktown and Williamsburg to Jamestown Island. Length—11.871 miles. The approximate quantities of the more important items are: 105,500 cu. yd. Excavation and Borrow, 10,500 tons Asphalt Concrete Base Course, 221,300 sq. yd. Cement Concrete Pavement and 11,000 tons Type I-1 Hot Asphalt Concrete Pavement. Minimum wage rates have been fixed as required by law. Plans, specifications and proposal forms are available upon request at the address given above or Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia. H. J. Spelman, Division Engineer.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4688) will be received at Red Bluff, California, until May 28, 1956, for furnishing labor and materials for Railroad and Highway Siphon, Corning Canal, Station 344+93 to Station 394+50, Sacramento Canals Unit, Central Valley Project, California. Location near Red Bluff, California. Principal items are 17,000 cu. yds. excavation; 211 cu. yds. concrete; 235 lin. ft. 102-inch concrete pipe; 83 lin. ft. tunnel, 132-inch steel-plate lined; and other work. Completion time 180 days. For particulars, address Bureau of Reclamation, P. O. Box 752, Red Bluff, California; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4684) will be received at Lindsay, California until May 29, 1956, for furnishing labor and materials for Construction of Timber Operating Bridge, Station 3607+00 and Repair and Reconstruction of Timber Operating Bridges, Station 3769+68.60 and Station 5165+80, Friant-Kern Canal, Central Valley Project, California. Location near Tulare, California. Principal items are 100 cu. yds. excavation; 1,970 lin. ft. furnishing and driving timber piles; 3.9 Mbm furnishing and erecting treated timbers in structures; 109.6 Mbm furnishing and erecting untreated timbers in structures; and other work. Completion time 150 days. For particulars, address Bureau of Reclamation, P. O. Box 2511, Sacramento 11, California; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: May 10, 1956

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 10th day of May 1956 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 3, WILLIAM ROBINSON, District Engineer Weigh Lock Building, Syracuse, N. Y.						
Onondaga	FARC 56-97 FGRC 56-98	Baldwinsville-Cold Spring, S.H. 671 Cold Spring-Liverpool, S.H. 670 Project No. S-405(2); SG-405(3)	1.06	Asph. Conc., Opt. 1 Br. Deck Plate Girder 500' 1 RR Sep. Comp. I-Beam 164.5'	$85,000 Plans $25	$1,570,000
DISTRICT No. 10, M. E. GOUL, District Engineer, Montauk Highway at Little East Neck Road, Babylon, L. I., N. Y.						
Kings	FA BQE 56-3	Brooklyn-Queens Expressway (Contract 16-A) Project U-1066(9)	0.52	Demolition	$3,200 Plans $10	58,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "STATE OF NEW YORK, COMMISSIONER OF TAXATION AND FINance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
Supt. of Public Works

Bids: May 29, 1956

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF MAIN SWITCHBOARDS & APPURTENANCES
SPECIFICATIONS NO. PA-5-14016
ST. LAWRENCE CONTRACT NO. P38

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture and furnishing of the Main Switchboards, consisting of one Main Control and Relay Board of 27 panels, one Station Service Control and Main Recorder Board of 10 panels, four (4) Generator Differential Relay Boards and one (1) Transmission Line and Station Service Metering Board of 3 panels, together with appurtenances and accessories, and the delivery thereof, f.o.b. the Authority's classification yard, Massena, New York, as follows:

(1) If brought in person on the day of receiving bids until 10:30 A.M. Eastern Daylight Saving Time on the 29th day of May, 1956, 270 Broadway, Hearing Room C, 6th floor, New York, New York.

(2) If mailed in until 10:15 A.M. Eastern Daylight Saving Time on the 29th day of May, 1956 at the Authority's Office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above. Bids will be entertained for the control, relay, recorder and metering boards, accessories and services in accordance with the bidding schedule. Erection at the site of installation will be done by Others but services of erecting engineers shall be provided by the manufacturer if and when required. Delivery of all switchboards, appurtenances and accessories will be required June 1, 1957.

Plans, Specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, may be inspected by prospective bidders during office hours, and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Ten ($10.00) dollars for initial set of Contract Documents and Five ($5.00) dollars for each additional set, no part of which will be refunded. Two sets must be returned with each bid.

Bids will not be restricted to American manufacturers.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. Bid deposit will be required with each bid in an amount not less than 10 percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN,
General Manager

Bids: May 22, 1956

Contract PW-2154

ADVERTISEMENT
WOODMERE RELIEF SEWERS
LAWNDALE AND VERNOR HIGHWAY ARMS
DEPARTMENT OF PUBLIC WORKS
CITY OF DETROIT, MICHIGAN

Sealed proposals for the construction of a relief sewer will be received at the Office of the City Engineer, 528 City-County Building, Detroit 26, Michigan, until 2:00 P.M., Detroit Time, May 22, 1956, and then at such place and time publicly opened and read aloud.

The work included consists of approximately one and one-half miles of sewers, varying in sizes from 18 inches to 6'-6" in diameter. The sewers 4'-0" in diameter or larger are to be built in tunnel. Smaller sizes may be constructed in open cut. The location of the work is in the southwest corner of Detroit in Vernor, Lawndale, Lafayette, and Elsemere Avenues.

The Bidding Documents may be examined at the Office of the City Engineer during business hours, and copies may be obtained upon deposit of $25.00 per set, which deposit will be refunded upon the return of the Bidding Documents in good condition within 10 days after the date for opening of bids.

Each proposal must be accompanied by a certified check, bank draft, or a satisfactory surety bid bond in an amount not less than 5 percent of the total bid price as guarantee and security for the acceptance of the Contract.

Checks shall be made payable to the Treasurer, City of Detroit.

No proposal once submitted may be withdrawn for at least 45 days after the actual opening of the bids. The City of Detroit reserves the right to waive any irregularity in any bid, or to reject any or all bids, should it be deemed for its best interest.

GLENN C. RICHARDS
CITY OF DETROIT
Commissioner of Public Works

M. F. WAGNITZ
City Engineer

Bids: May 22, 1956

Contract 461

ENGINEERING NEWS-RECORD
EXPLORATORY SHAFT,
ACCESS ROADS, ETC.

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M. Eastern Daylight Saving Time (10:00 A.M., Eastern Standard Time) on Tuesday, May 22, 1956, for Contract 461, for the construction of a reinforced concrete exploratory shaft at the site of the proposed Cannonsville dam, the furnishing and installation of equipment for pumping ground water from the shaft, the pumping of ground water during the period of the contract, the construction of access roads, including two bridges, the excavation of shovel cuts and the construction of appurtenant structures. The shaft and access roads, will be located in the Town of Deposit, Delaware county, New York.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained in Room 1317, at the above address, upon application in person or by mail, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars ($4.00) will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners, Board of Water Supply; BETTY COHEN, Acting Secretary.

Bids: May 15, 1956

Township of Haddon, N. J.

NOTICE TO BIDDERS

CONSTRUCTION AND RE-CONSTRUCTION OF SEWAGE TREATMENT PLANT

Sealed proposals addressed to Ethel Atkinson, Township Clerk, 8 Reeve Avenue, Westmont, N. J., for the construction and reconstruction of the Westmont Sewage Treatment Plant will be received by the Township of Haddon in the Municipal Building, Westmont, New Jersey on Tuesday, May 15, 1956 at 8:00 P.M. prevailing time.

Plans, specifications and detailed information may be examined at the office of the Engineer, John H. Osler, 523 Haddon Avenue, Collingswood, N. J.

Bidders will be furnished with a copy of the specifications and blue prints of the drawings by the Engineer upon payment of $100.00 which will be refunded to all unsuccessful bidders.

ETHEL ATKINSON
TOWNSHIP CLERK

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4676) will be received at Santa Maria, California, until June 1, 1956, for furnishing labor and materials for Vaquero Dam and Access Road, Santa Maria Project, California. Location near Santa Maria, California. Principal items are 7,150,000 cu. yds. excavation; 5,400,000 cu. yds. embankment; 23,600 cu. yds. concrete; and other work. Completion time 900 days. For particulars, address Bureau of Reclamation, Santa Maria, California; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: May 15, 1956

Mackinac Bridge Authority

Advertisement for Proposals
for the
Construction of the Deck Concrete
and Asphalt
for
Mackinac Straits Bridge

The Mackinac Bridge Authority will receive sealed proposals for the construction of Contract No. 3, Deck Concrete and Asphalt, for the Mackinac Straits Bridge until 10:00 A.M. Eastern Standard Time on the 15th day of May, 1956, at the office of the Authority, 608 Prudden Building, Lansing, Michigan, at which time and place proposals will be publicly opened and read aloud.

The work of this contract includes the construction of the concrete deck and asphalt surfacing for two 23-ft. wide roadways, together with walkways, on the suspension spans and truss span approaches of this bridge.

The bridge consists of four, four-span continuous truss span units on the south approach as follows: (160-200-200-160), (327.5-393-393-327.5), (480-560-560-480), and (327.5-393-393-327.5) feet in length; three, four-span continuous truss spans on the north approach as follows: (160-200-200-160), (327.5-393-393-327.5) and (327.5-393-393-327.5) feet in length; two anchorages 135 feet in length; two backstay spans 472 feet in length, two suspended side spans eighteen hundred (1800) feet in length, and the main suspended span thirty-eight hundred (3800) feet in length. All the above-mentioned spans with the exception of the first 160-foot span on the south approach are over water, the main span being 155 feet above low water at center of span.

The principal items of work include:

	Approximate Quantities
Bituminous Concrete	6,025 Tons
Grade A Concrete	11,536 Cu. Yds.
Lightweight Concrete	2,029 Cu. Yds.
Steel Reinforcement	2,637,911 Lbs.

Plans, Specifications, Proposal Form and Contract Documents for the work are on file in the office of the Mackinac Bridge Authority and in the office of D. B. Steinman, Consulting Engineer, 117 Liberty Street, New York 6, New York, and may be inspected by prospective bidders during office hours.

Plans, Specifications, Proposal Form and Contract Documents may be obtained from D. B. Steinman, Consulting Engineer, 117 Liberty Street, New York 6, New York upon application and payment of a fee of twenty-five ($25.00) dollars, fifteen ($15.00) dollars of which will be refunded upon return of the Plans to non-bidders, and all of which would be returned to bidders.

Bids must be made upon the proposal form included in the Contract Documents. Each proposal must be accompanied by draft or certified check payable to the order of the Mackinac Bridge Authority for the sum of one hundred thousand ($100,000.00) dollars.

The right is reserved to reject any or all bids.

MACKINAC BRIDGE AUTHORITY
Prentiss M. Brown, Chairman

Bids: June 5, 1956

Power Authority of the State of New York Advertisement for Proposals

FOR
ELECTRICAL WORK AT THE BARNHART ISLAND SWITCHYARD NEAR MASSENA, ST. LAWRENCE COUNTY, NEW YORK
SPECIFICATION NO. PA-5-14032
ST. LAWRENCE CONTRACT NO. 26

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the electrical work at the Barnhart Island Switchyard near Massena, St. Lawrence County, New York, in the following ways:

(1) If brought in person on the day of receiving bids, until 10:30 A. M. Eastern Daylight Saving Time on the 5th day of June, 1956, 270 Broadway, Hearing Room C on the 6th floor, New York, New York.

(2) If mailed in, until 10:15 A. M. Eastern Daylight Saving Time on the 5th day of June, 1956, at the Authority's office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above.

The work includes but is not limited to the installation of the following Authority furnished equipment consisting of high pressure oil pipe type cable, power circuit breakers, disconnecting switches, lightning arresters, carrier current equipment, metering equipment, insulator assemblies and bus supports for both 115 kv and 230 kv service, autotransformers, metalclad switchgear, unit substations, motor control center, control battery and appurtenances, lighting and miscellaneous power transformers, lighting system and all wire and cable; the furnishing and installing of miscellaneous electrical equipment, exposed conduit and grounding, switchyard buses, line and static conductors, cable trays and clocks; and making electrical connections to equipment of a basically non-electrical nature such as the air compressor insulating oil system; cooling water system; fire protection system and sump pumps.

The work shall be completed on or before December 1, 1959.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electrical Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, may be inspected by prospective bidders during office hours, and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Twenty-Five ($25.00) dollars, for initial set and Ten ($10.00) dollars for each additional set, no part of which will be refunded.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 10 percent of the gross sum bid.

The right is reserved to reject any or all bids.

GENERAL MANAGER
W. S. CHAPIN

Bids: June 12, 1956

City of Campbell, Ohio

ADVERTISEMENT
For the Construction of
Sewers, Lift Station and Force Main
Contract 1
Sewage Treatment Plant
Contract 2

Sealed proposals will be received by the City of Campbell, Mahoning County, Ohio, at the Office of the Director of Public Service, Municipal Building, Campbell, Ohio, until one (1) o'clock (Daylight Savings Time) June 12th, 1956, and then publicly opened and read for the construction of:

CONTRACT 1—Sewers, Lift Station and Force Main

CONTRACT 2—Sewage Treatment Plant for the City of Campbell, Ohio.

The proposed work under Contract 1 consists of furnishing and installing approximately 1.14 miles of sanitary sewers varying in diameter from 12 inches to 24 inches, together with special structures, manholes, junction and regulating chambers, approximately 1665 feet of 14 inch cast iron force main and a lift station complete with pumps and all appurtenances.

The work is generally located in Wilson Avenue along the abandoned Inter-Urban Railroad right-of-way in the western portion of the city.

The proposed work under Contract 2 consists of construction of a chemical precipitation type of sewage treatment plant consisting of a regulating chamber, grit removal and screening device, pumping equipment, flocculation, settling and sludge digestion tanks, chemical feeders, sludge dewatering equipment, metering equipment, operating building and all appurtenances.

Copies of the plans and specifications and blank proposals may be obtained or examined at the Office of the Director of Public Service, Municipal Building, Campbell, Ohio, and at the office of Floyd G. Browne and Associates, consulting engineers, 125 West Church Street, Marion, Ohio, after April 28th, 1956.

Payment in the amount of twenty dollars ($20.00) will be required for each set of plans and specifications taken from the above offices. Checks in payment for plans and specifications shall be made payable to the order of the City of Campbell, Ohio. The full amount of the deposit for one (1) set of plans and specifications will be refunded to bona fide bidders and fifteen dollars ($15.00) will be refunded to others upon the return of same in good condition within thirty (30) days of bid opening date.

Each proposal shall contain the full name and address of the party, or parties, making the same and all persons interested therein, and shall be accompanied by a certified check or bank draft on a solvent bank in the sum of five (5) percent of the amount bid, made payable to the City of Campbell, Ohio, or by a proposal bond signed by a surety company authorized to do business in Ohio, as a guarantee that if the bid is accepted, a contract will be entered into and the performance of it properly secured by a one hundred (100) percent performance bond.

No proposal will be entertained unless made on the blank(s) attached to the bond document and furnished by the Director of Public Service or Engineer, previous to one (1) o'clock (Daylight Savings Time) on the day specified. Any bid received after this time will be returned unopened to the bidder.

The bidder's attention is directed to the necessity of starting the work at once upon written notice to proceed as time is an important element in this contract.

Attention of the bidder is called to the special construction regulations which are included in the specifications, to the special requirements for procurement of labor, wage rates, hours of employment, and to special information given in instructions to bidders. The character and amount of bid and performance bonds are stated in the instructions to bidders.

No bidder may withdraw his bid for a period of forty-five (45) days after the time of opening bids.

The City reserves the right to reject any or all bids, waive any informalities or irregularities in the bids received, and to accept the lowest and best bid.

CITY OF CAMPBELL, OHIO
JOHN V. DE MART,
Director of Public Service

Bids: May 22, 1956

Power Authority of The State of New York

ST. LAWRENCE POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF 115 KV & 230 KV DISCONNECTING SWITCHES
SPECIFICATIONS NO. PA-5-14022
ST. LAWRENCE CONTRACT NO. P37

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture and furnishing of 115 kv and 230 kv disconnecting switches and appurtenances and delivery thereof, f.o.b. cars at destinations, in the following ways:

(1) If brought in person on the day of receiving bids until 10:30 A.M. Eastern Daylight Saving Time on the 22nd day of May, 1956, Hearing Room C, 6th floor, 270 Broadway, New York, New York.

(2) If mailed in until 10:15 A.M. Eastern Daylight Saving Time on the 22nd day of May, 1956, at the Authority's office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above. Bids will be entertained for the 115 kv and 230 kv disconnecting switches and appurtenances in accordance with the bidding schedules. Installation of the 115 kv and 230 kv disconnecting switches and appurtenances will be done by Others. Delivery of the 115 kv and 230 kv disconnecting switches and appurtenances will be required starting June 1, 1957.

Specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, may be inspected by prospective bidders during office hours, and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Ten ($10.00) Dollars for initial set of Contract Documents and Five ($5.00) Dollars for each additional set, no part of which will be refunded. Two sets must be returned with each bid.

Bids will not be restricted to American manufacturers.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. A bid deposit will be required with each bid in an amount not less than 10% of the maximum price bid for any schedule.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

OFFICIAL PROPOSALS

Bids: May 10, 1956

Delaware River Port Authority
Administration Building
Camden, New Jersey

RAMP 'M' STRUCTURE OVER PACKER AVENUE and 20th STREET
PHILADELPHIA APPROACHES
WALT WHITMAN BRIDGE CONTRACT NO. P-12

Sealed bids will be received for Ramp 'M' Structure Over Packer Avenue and 20th Street, Philadelphia Approaches of the Walt Whitman Bridge, known as Contract No. P-12, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey until 2:30 P. M. Eastern Daylight Time, May 10, 1956, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of a $10.00 check which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $25,000 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania, or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO
April 18, 1956 Executive Director

Bids: May 10, 1956.

Delaware River Port Authority
Administration Building
Camden, New Jersey

POLICE BUILDING—GENERAL CONSTRUCTION WORK
GLOUCESTER APPROACH
WALT WHITMAN BRIDGE CONTRACT NO. G-7A

Sealed bids will be received for the Police Building on the Gloucester Approach of the Walt Whitman Bridge, known as Contract No. G-7A, at the office of the Executive Director of the Delaware River Authority, Administration Building, Bridge Plaza, Camden, New Jersey, until 2:30 P. M. Eastern Daylight Time, May 10, 1956, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of a $10.00 check, which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $2,000, payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania, or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO
Executive Director

Bids: May 10, 1956

Delaware River Port Authority
Administration Building
Camden, New Jersey

POLICE BUILDING—PLUMBING WORK
GLOUCESTER APPROACHES
WALT WHITMAN BRIDGE CONTRACT NO. G-7B

Sealed bids will be received for the Police Building Plumbing Work on the Gloucester Approaches of the Walt Whitman Bridge, known as Contract No. G-7B, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey until 2:30 P. M. Eastern Daylight Time, May 10, 1956, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of a $10.00 check, which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $200.00 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania, or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO,
Executive Director

Bids: May 10, 1956.

Delaware River Port Authority
Administration Building
Camden, New Jersey

POLICE BUILDING—HEATING WORK
GLOUCESTER APPROACHES
WALT WHITMAN BRIDGE CONTRACT NO. G-7C

Sealed bids will be received for the Police Building Heating work, on the Gloucester Approaches of the Walt Whitman Bridge, known as Contract No. G-7C at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey until 2:30 P. M. Eastern Daylight Time, May 10, 1956, at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of a $10.00 check which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $200.00 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania, or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO,
Executive Director

Bids: June 28, 1956.

Roadway & Bridges

COMITé EJECUTIVO DE VIALIDAD
PROVINCIA DEL GUAYAS
GUAYAQUIL, ECUADOR

Notice is hereby given that the Comité Ejecutivo de Vialidad will receive bids for construction of a highway between Nobol in the Province of Guayas to Jipijapa in the Province of Manabi, all in the Republic of Ecuador, a distance of 106 kilometers, more or less.

Discription of work—Principal items of work include 330 hectares clearing and grubbing; 2,408,000 cubic meters unclassified roadway excavation; 32,670 cubic meters unclassified structure excavation; 737,600 cubic meters—100 meter overhaul, unclassified roadway excavation and borrow; 842,000 cubic meter kilometers haul and apply water; 243,000 cubic meters selected borrow base course; 2,413,000 cubic meter kilometers, over haul selected borrowed base course, 7,670 linenal meters corrugated metal pipe various diameters, 24" to 96"; forty each reinforced concrete box culverts, 3 reinforced concrete flat slab bridges, and 1-6 span, I-beam girder bridge with concrete deck, principal items of which are 7,100 cubic meters P.C. Concrete, 700,000 lbs. reinforcing steel, 380,000 lbs. structural steel and 160 piles.

Plans may be examined and forms of proposal, bonds, contracts and specifications may be obtained, at the office of the Comité in Guayaquil, Ecuador.

A representative of the Comité will be available to accompany prospective bidders for an inspection of the work herein contemplated and contractors are urged to investigate the location, character and quantity of work to be done.

Each bid shall be made out on a form which shall be obtained at the office of the Comité. Each bid shall be accompanied by a certified check for Five Hundred Thousand (S/500,000.00) sucres or Thirty Three Thousand ($33,000.00) Dollars, as a proposal guarantee, and no bid shall be considered unless such certified check is enclosed therewith. The certified check shall be made payable to the order of the Comité Ejecutivo de Vialidad.

Bids shall be sealed and filed with the Comité Ejecutivo de Vialidad, at their office in Guayaquil, Ecuador on or before six o'clock, P. M. on the 28th of June 1956 and will be opened and publicly read aloud at or about six o'clock, P. M. of that day in the conference room of said office.

COMITé EJECUTIVO de VIALIDAD,
CASILLA 4182, GUAYAQUIL, ECUADOR, S.A.

CABLE: COMIVIAL
CONSULTING ENGINEERS:
MICHAEL BAKER, JR., INC.
CASILLA 4746 GUAYAQUIL,
ECUADOR, S.A.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4687) will be received at Albuquerque, New Mexico, until June 7, 1956, for furnishing labor and materials for Channelization of the Rio Grande, Socorro Area, Station 627 to Station 1400, San Antonio to Escondida, Middle Rio Grande Project, New Mexico. Location near Socorro, New Mexico. Principal items are 462 acres clearing; 137,000 cu. yds. excavation; 129,000 cu. yds. pit-run gravel blanket and surfacing; 6,000 metal jetty units for bank protection; and other work. Completion time 560 days. For particulars, address Bureau of Reclamation, P. O. Box 252, Albuquerque, New Mexico; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4681) will be received at Sargent, Nebraska, until May 29, 1956, for furnishing labor and materials for Earthwork and Structures for Sargent Canal, Station 1109+76.59 to Station 2118+63 (End), Sargent Laterals, Section Section, and Airport Wasteway, Missouri River Basin Project, Nebraska. Location near Sargent, Nebraska. Principal items are 1,358,000 cu. yds. excavation; 3,100 cu. yds. concrete; 15,730 lin. ft. furnishing and laying concrete pressure pipe; and other work. The work is divided into two schedules. Completion time 650 days. For particulars, address Bureau of Reclamation, P. O. Box 357, Sargent, Nebraska; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work
Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered
Employment Agencies
Employment Services
Labor Bureaus

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The advertising rate is $28.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

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Position Wanted ads take ½ of above rate.

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Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, 330 W. 42nd St., N. Y. 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Wanted: Surveyor or Engineer capable of doing layout work for air base paving and grading work. Also must be familiar with doing own computations and cross sectioning of volumes. Located in Texas and Oklahoma. P-1404, Engineering News-Record.

Municipal consultant and land surveyor in Detroit area wants chiefs of party. Land surveyor, minimum 3 years experience, registered preferred. Construction layout party chief. Salaries commensurate with ability—$6,300-$7,500. P-1364, Engineering News-Record.

University Teaching position open in the fields of engineering drawing and descriptive geometry, Dept. of Engineering Mechanics, University of Nebraska. Engineering degree is necessary. Opportunity to do graduate work. Rank and salary based on applicant's education and experience. Write inquiries to E. J. Marmo, Professor and Chairman of Department, Lincoln 8, Nebraska.

Wanted: Man qualified to handle estimating for medium sized reinforcing fabricator. Some detailing required. Outstanding opportunity to grow with company. In Phila. area. Starting salary $135.00 per week. P-1449, Engineering News-Record.

Civil Engineer, preference given to man with Illinois, County, Township or Federal Aid Secondary, survey, design or construction experience or equal. Position permanent, good working and living conditions. Give education, experience and salary expected. Hancock County Highway Department, Carthage, Illinois.

Wanted Two sewer and waterline foremen. Only experienced and sober apply. P-1541, Engineering News-Record.

General Superintendent to assume complete charge of all field operations for building contractor located Twin Cities, Minnesota. Give age experience references and salary requirements. Top man only. P-1499, Engineering News-Record.

When Writing Your Ad

Provide an indexing or subject word.
Write it as the first word of your ad.
If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.
This will assure proper classification in the column.
The right is reserved to reject, revise or properly classify all Want Advertisements.

Proper Classification increases the possibility of Prompt Returns

POSITIONS VACANT

Wanted experienced Estimators on building construction and reinforced concrete work with well-established Massachusetts Contractor. Good opportunity. P-1498, Engineering News-Record.

Estimator well established company doing business in industrial commercial and institutional construction solicits inquiries from experienced estimators. Location-Twin Cities, Minnesota. Give age experience references and salary requirements. P-1501, Engineering News-Record.

Engineers Civil, Hydraulic, Soils or Dam broad experience available in planning, design and construction of flood control projects in State of Pennsylvania. Work includes broad phase of hydraulics, hydrology, soil mechanics and reinforced concrete design. Salary from $4524 to $6294 per annum depending on experience and qualifications. Chief, Design Branch responsible for supervision of engineering design groups engaged in design of flood control projects. Applicants must have experience in the design of flood protection projects and be familiar with hydraulics, soil mechanics and concrete design. Salary commensurate with experience. Fringe benefits including liberal promotion policy, vacation, sick and holiday leave benefits and retirement system. State education, experience, age, salary expected and references. P-1510, Engineering News-Record, 330 W. 42nd Street, New York 36, New York.

Engineers experienced in design and supervision of construction to work as resident engineers or prepare plans for water and sewer systems. State experience, age, salary required, when can report, and give references. Reply P-9290, Engineering News-Record.

Civil Engineer. Prefer 5 to 10 years experience in design and details of sewer and water systems, drainage and grading, street work, municipal engineering. For Midwest consulting firm. Salary $6,000-$8,000 plus overtime and benefits. Sverdrup & Parcel, Inc., Engineers-Architects, 915 Olive, St. Louis 1, Mo.

Soils Engineer. Soils work in connection with foundations of bridges, buildings, highway and miscellaneous structures, also testing and control of placement of earth fills for highway and railway project. Prefer associated ability in civil or structural design engineering. For Midwest consulting firm. Salary $6,000-$8,000 plus overtime and benefits. Sverdrup & Parcel, Inc., Engineers-Architects, 915 Olive, St. Louis 1, Mo.

Small company in North Branch, N. J. requires young chemical engineer. Experience in process equipment layout and cost estimating desirable. Pleasant surroundings and congenial working conditions. Phone Randolph 5-3232, Ext. 8 or Write P-1437, Engineering News-Record.

Civil Engineer $5005 to $5616. Graduate with one or two years experience. Opportunity to advance in Engineering Department of fast growing City near Detroit. Apply to: Personnel Officer, 26 Market Street, Mount Clemens, Michigan.

Need man with degree in civil engineering and some experience in a municipal engineering department. Salary open. Exceptional chance for rapid advancement exists. P-1573, Engineering News-Record.

Civil Engineer: For the Engineering Division of the Public Works Department for the Town of Fairfield, Connecticut. Salary range from $5500.00 to $6900.00. Applicant should have a minimum of two years general municipal engineering work. Please state full qualifications, experience, references. Apply to Town Engineer, Town of Fairfield, 608 Jennings Road, Fairfield, Connecticut.

SALARIED POSITIONS $5,000 — $35,000

We offer the original personal employment service (established 46 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars.

R. W. BIXBY, Inc.
559 Brisbane Bldg. Buffalo 3, N. Y.

POSITIONS VACANT

Municipal Engineer: Wanted to be in charge of the Engineering Division of the Public Works Department for the Town of Fairfield, Connecticut. Salary range from $7100 to $9100. Applicant should have at least three years experience in municipal sanitary, storm water and street design and layout. Please state full qualifications, experience, references. Apply to Town Engineer, Town of Fairfield, 608 Jennings Road, Fairfield, Connecticut.

Construction Foreman with extensive experience all types sewers, water mains, general heavy underground construction within N. Y. State. We require top notch foreman—not job superintendent. Permanent position for qualified person able to justify good salary. P-1541, Engineering News-Record.

Engineering graduate for position of assistant to Chief Engineer of old New England engineering organization on specifications and design of airfield pavements and structures in New England. Give full details of experience and education. Salary $7200.00 per year. P-1562, Engineering News-Record.

Young architect or engineer, recent graduate in upper 10% of class only, $500 mo. as office engineer for construction of regional shopping centers. Experience not essential, write 2530 Woodville Rd., Toledo 5, Ohio.

Civil Engineer with several years experience in site work including design of roadways, parking lots, sewers, sewage disposal systems, etc. Permanent connection. Eberle M. Smith Associates, Inc., architects-engineers, 153 East Elizabeth Street, Detroit, Michigan, Woodward 5-8180.

Civil Engineer Needed City of Moline, Ill. needs engineer for general municipal engineering with experience in design and supervision of street, water and sewer construction. Salary $6,000.00 yearly with paid vacation, sick leave and retirement plan. Submit resume in first letter to City Engineer, Moline, Ill.

General Superintendent—Who is now super-intendent engineer and wants to take next step up with growing N. J. organization. P-1579, Engineering News-Record.

Office Engineer—Civil, 2 years construction experience, estimating, checking details, job coordinator, expediting, etc. North New Jersey. P-1576, Engineering News-Record.

Engineering Assistant, Civil — for general municipal engineering including traffic. Two years college engineering, three years subprofessional experience, including one year traffic and parking problems. Salary range $390-$480 mo. Apply Personnel Department, City of Palm Springs, Box 850, Palm Springs, California.

Bridge Designers — Highway Department — Mountain West. Permanent positions in new office building. 5 day week. Starting $510 up. Paid vacations, sick leave. Retirement program. Hospitalization optional. Employee rating system with periodic advancement based on merit. Opportunity to work on all phases of bridge design from hydraulics to completed structure. Include summary of education, experience, personal history, references. Write: Personnel, Wyoming Highway Department, Box 931, Cheyenne, Wyoming.

(Continued on following page)

ENGINEERS
DESIGNERS
DRAFTSMEN

Permanent openings in our St. Louis and San Francisco offices for qualified personnel experienced in design of structural steel and reinforced concrete for work on

BRIDGES & BUILDINGS
HYDROELECTRIC PROJECTS
INDUSTRIAL FACILITIES

Openings also available for mechanical and electrical designers and draftsmen for work on power plants, test facilities, large electrical installations and general industrial projects. Several recent graduate engineers will be added in all categories.

We desire men who want long range employment with ample opportunity for professional development and advancement. Excellent Employee Benefits & Retirement Plan, generous annual leave and sick leave, Blue Cross, paid holidays.

Please write fully to

SVERDRUP & PARCEL, INC.
Engineers — Architects
915 Olive Street St. Louis 1, Mo.

CIVIL ENGINEER

Opportunity for a civil engineer with building construction experience for position as Chief Engineer on one to three million dollar projects. Location Northeastern United States. Kindly give full resume; strictly confidential.

P-1540, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

WANTED IMMEDIATELY

Hydraulic Engineer experienced in Earth and Concrete Dam Design
Soils Engineer Experienced in Embankment Design of Dams—Slip Circle Analysis
Sanitary Engineer experienced in Design of Sewage Disposal and Industrial Waste Plants

Send Complete Resume in First Letter to

HARVEY B. SMITH
Gannett Fleming Corddry & Carpenter, Inc.
Box 366, Harrisburg, Pa.

HIGHWAY ENGINEERS
for work in
New Jersey and New York

Designers, draftsmen, chiefs of party, specification writers — submit complete resume stating education, experience, salary desired and date of availability to

P-1603 Engineering News-Record
330 W. 42 St. New York 36, N. Y.

POSITIONS VACANT
(Continued from preceding page)

Wanted Grade Foreman familiar with all types of excavation and pipe work. Work in central New York. Good opportunity. Experience-references. P-1595, Engineering News-Record.

EMPLOYMENT SERVICE

Salaried personnel, $5,000-$30,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L. P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Experienced building estimator, 30, married. 9 years experience with one contractor. Proven performance record in bidding, purchasing and job management. Includes 2½ years as project manager on two multi-million dollar projects. Desires responsible position with opportunity to advance with general contractor. PW-1416, Engineering News-Record.

Chief Structural Engineer buildings—single and multiastory foundations, civil and waterfront work location New York City. PW-1425, Engineering News-Record.

Construction Superintendent and engineer desires work in New England. Experienced industrial, building, marine and heavy construction, housing, road structures and drainage. PW-1325, Engineering News-Record.

Construction Executive, buildings and heavy construction, sound experience bid to completion, qualified to manage a project, branch office or a business, seeks new connection where top man is required. Minimum $15,000, PW-8792, Engineering News-Record.

Civil Eng. Reg. 28 yrs. old with experience in const. of roads, sewers, foundations, earth work, steel and masonry work. Now employed as Asst. project mgr. on large const. job. Wants job with contractor as supt. or assistant. PW-1604, Engineering News-Record.

Chief Engineer fabrication of piping, pressure vessels, codes, estimating, negotiating, supervision of personnel. Project Engineer design, construction chemical and petro plants. Age 41, New Jersey P.E., domestic or foreign. PW-1572, Engineering News-Record.

Chief Project Engineer, young, personable, aggressive, competence proven on major projects. Registered Civil and structural engineer California and numerous states. Twenty years experience in design and construction of dams, hydroelectric projects, industrial structures, soil mechanics and foundations. Seeks association with participation potential. PW-1537, Engineering News-Record.

Cost estimator—heavy construction. 15 yrs. experience includes pricing, running projects from bid to completion, buying, closing with subs. Highways, bridges, marine work, sewers, foundations, and underpinning. 35, N.Y.C. vic. P.E. PW-1538, Engineering News-Record.

Executive — Manager — Engineer. Graduate, registered, civil and mining. 41. Twenty years diversified experience in mining and industrial construction project management for owners. Minimum $12,000. PW-1542, Engineering News-Record.

Construction Engineer, 26, single, residing in West Germany. Experience: Industrial structures in Germany and Northern Sweden. Desires to work for Canadian or US company in Canada. PW-1566, Engineering News-Record.

Construction Superintendent & Engineer, 25 years sound experience in highways & appurtenances seeking permanent change of location to Florida or south. Age 43. PW-1600, Engineering News-Record.

Soils and Materials engineer — M.S. (soil mech.); M.S. (highway engg.), regd. P.E. (Ill.), single about 38 years. Over six years office and field experience. Completing a job as chief, soils section (and in charge soil testing lab.) for a firm in Chicago. Present emoluments around $9,000 year. Any location with suitable compensation. PW-1598, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Illinois.

SELLING OPPORTUNITY WANTED

Engineer, Technologist, retired, would represent, Long Island, Manufacturers, dealers, engineers. RA-1474, Engineering News-Record.

ENGINEERS
HIGHWAYS AND BRIDGES
Designers
Draftsmen
OPENINGS At
Rochester, Penna., Harrisburg, Penna., College Park, Md.

ARCHITECTS
Architectural Draftsmen
OPENINGS At
Rochester, Penna.

Send Resume Including Education, Experience, Salary Requirements and Availability TO:

Richard L. Shaw, *Personnel Director*

Michael Baker, Jr., Inc.
Consulting Engineers
Baker Building Rochester, Penna.

INSPECTOR ENGINEER

Graduate Mechanical Engineer with minimum 3 years' experience in work involving thorough knowledge of the materials and equipment used for oil producing, refining and supporting facilities. Knowledge A.P.I. and A.S.M.E. and other production codes required. For New York office, however, job requires extensive travel throughout the U. S. to inspect and approve purchased equipment and materials.

Salary commensurate with education and work experience. Liberal benefit program. Write outlining personal history and work experience.

Recruiting Supervisor, Box 114

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, N. Y.

EXPERIENCED HYDRAULICS ENGINEER WANTED

Graduate engineer experienced in paper mill hydraulics, planning and development of piping layout systems, etc. for large expanding and progressive mill in Maryland. Good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to
Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland

ENGINEERS—DESIGNERS—DRAFTSMEN
Expressway—Toll Road—Structural

Consulting Firm in active general practice now staffing for design-construction phases toll road and general assignments; receiving applications from experienced expressway designers; highway designers and draftsmen; structural and staff engineers. Immediate assignments Chicago Area. Confidential resume to
HOMER L. CHASTAIN & ASSOCIATES
1880 Shermer Ave. Northbrook, Illinois

SALES ENGINEERS

A major steel company has need for sales engineers to promote and sell fabricated products in middle Atlantic states. Excellent opportunities for men 25 to 30 years old with engineering background and a desire for sales work. Attractive starting salary with company car, expenses and bonus plan.

P-8324, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

WANTED IMMEDIATELY

Bridge superintendent capable of handling structures and large highway project in Sullivan County area, New York State.

Apply

Westcott Construction Corp.,
Savings Bank Building,
North Attleboro, Mass.

CONSTRUCTION EQUIPMENT ENGINEER

(Supervisory)

Graduate engineer with minimum 7 years' experience designing, selecting, specifying and/or supervising operations of construction equipment, such as crawlers, rubber-tired tractors, shovels, cranes, air compressors, welding machines, pumps, mixers, spreaders, fork lifts, etc.

To consult with manufacturers and suppliers on selection and modification of the above-mentioned equipment. For company's Equipment Engineering Division located in New York City. Salary good; liberal benefits.

Write giving full particulars regarding personal history and work experience. Please include telephone number.

Recruiting Supervisor, Box 89

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, NEW YORK

ENGINEERS—DESIGNERS—DETAILERS

for work on

BRIDGES AND HIGHWAYS

Permanent Positions for Experienced Men and New Graduates in our CINCINNATI, OHIO, and LANSING, MICHIGAN, Offices.

Paid vacations and holidays, insurance and retirement plan.

Please give detailed personal and experience record, references and salary expected in application letter.

Hazelet & Erdal, Consulting Engineers
Dixie Terminal Bldg.
Cincinnati 2, Ohio

CIVIL ENGINEER

College graduate - age 30 to 45. Eight to ten yrs. exp. in industrial building construction and service facilities for in-plant engineering. Excellent opportunity. Company paid hospitalization, surgical, life insurance and pension

Send Resume to

CAMPBELL SOUP COMPANY
CAMDEN 1, N. J.

Structural architectural engineer with steam electric and hydro-electric power plant experience to supervise structural steel design, prepare specifications, inquiries and purchase requisitions. Experience in other fields of engineering desirable.

STRUCTURAL ENGINEER

Position with large New York engineering and construction firm. Regular staff position with liberal company benefits. Salary commensurate with experience. Excellent opportunity for future advancement.

Please submit complete resume to:

P-1486, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

DESIGN ENGINEERS

You can fill a desirable *permanent* position in McKee's enlarged Refinery, Metals or Industrial Divisions. Our expansion program gives you excellent opportunity for advancement in one of the world's largest engineering firms.

World-wide McKee operation offers you wide choice in the design of Petroleum Refineries, Chemical Plants, Blast Furnaces, Steel Plants, Sintering Plants and Industrial Plants in the following fields:

PIPING LAYOUT, STRUCTURAL STEEL, CONCRETE, PROCESS HEATERS, EQUIPMENT SPECIFICATIONS, LAYOUT AND PROCESS DESIGN. ALSO PIPING AND ELECTRICAL DRAFTSMEN.

You get top compensation, the security of a life-long pension, paid vacations, benefits of insurance, hospitalization, sick-leave pay and training program.

You'll work with modern equipment in large air-conditioned quarters. Free parking on premises.

Cleveland has attractive residential areas, excellent schools and colleges for you and your family. McKee makes generous transportation and moving allowances.

Write for an interview giving education and experience. No age limitations. All letters kept strictly confidential. Write today to:

Edward A. Kolner

ARTHUR G. McKEE & COMPANY
2300 Chester Avenue
Cleveland 1, Ohio

TRAFFIC ENGINEERING AIDE

A leading engineering and construction company with headquarters located in Midwest, has immediate opening available for a Civil Engineering Graduate with some traffic or highway experience, including drafting chart work and technical reports. Must be willing to travel throughout the United States and Canada.

Good starting salary, plus many company benefits, including group life insurance and hospitalization program, paid vacation and holidays, and sick leave accrual plan.

Please submit complete resume, stating education, experience, salary requirements and earliest date available to:

THE H. K. FERGUSON COMPANY
Engineers and Builders
1783 East 11th St. Cleveland 14, Ohio

Opportunity For ARCHITECTURAL and CIVIL ENGINEERS

THE Technical Department, Douglas Fir Plywood Association, has three excellent openings in its Tacoma, Washington, research laboratory:

1—ENGINEER ANALYST. Creative engineering for the plywood industry. An especially attractive opportunity for a civil engineer interested in structural research. Mathematical analyses of conventional and unconventional structural applications of plywood; laboratory testing of plywood products, assemblies and fastenings. Good knowledge of mathematics, mechanics, and strength of materials essential. Experience in structural design, laboratory techniques and statistical methods desirable.

2—CIVIL OR ARCHITECTURAL engineering graduate who can grasp the significance of research findings and translate into usable design data for engineering applications. Prepare typical structural designs and details. Sound engineering background and writing ability are essential.

3—ENGINEER CORRESPONDENT who can, in response to inquiries, advise and assist specifiers in proper use of plywood. A civil or architectural engineering graduate with a knowledge of good construction practice and a command of written English will find this an excellent opportunity.

The location, Pacific Northwest, is one of the nation's fastest growing areas; long-range development of fir plywood and related wood products means an attractive future. The salary for all three openings is open and will depend on qualifications. Write fully—experience, education, salary requirements. H. S. Perkins, Technical Director, Douglas Fir Plywood Assoc., Tacoma 2, Wash.

ENGINEERS & DESIGNERS

MECHANICAL —
Design experience in one or more of the following fields: Instrumentation and controls for Industrial Equipment, Refinery and Chemical Plant Processes, Steam Power Plants, Materials Handling Equipment, Metallurgical Process Equipment such as metallurgical furnaces, kilns, crushers, or related heavy machinery, heating and ventilating, or industrial plant layout.

ELECTRICAL —
Responsible design experience on panel boards, industrial controls, power distribution or lighting.

STRUCTURAL —
Design or detailing experience in structural steel and/or re-inforced concrete for industrial projects.

PIPING —
Designers with drafting and layout on high temperature high pressure piping.

Immediate openings in our SAN FRANCISCO offices for men with above stated job experience.

BECHTEL CORP. is a progressive engineering and construction firm engaged in world-wide operations.

LIBERAL RELOCATION ALLOWANCES COVERING APPLICANTS, FAMILY & HOUSEHOLD EFFECTS

BECHTEL
Engineers - Constructors

Send Resume:
5 West 45th St. New York 17, N. Y.
220 Bush St., San Francisco, Calif.

Confidential interviews can also be obtained at: Scanlon Building, Houston, Texas, or Roosevelt Building, Los Angeles, Calif.

SPECIFICATIONS WRITER

A leading international industrial engineering company has immediate opening available for an experienced building specification writer.

Applicants should possess at least five years experience writing building specifications for material purchases and subcontract specification for all building trades.

This is a permanent position offering good starting salary, all fringe benefits, good working conditions, high management cooperation, and opportunity for advancement.

Please submit a complete resume stating education, experience, salary requirement, and earliest date available to:

The H. K. FERGUSON COMPANY
ENGINEERS AND BUILDERS
1783 East 11th St., Cleveland 14, O.

ENGINEERS

Long established firm of consulting engineers with world-wide practice needs both beginners and experienced civil, electrical, mechanical, and foundation engineers for interesting work on large dams, powerplants, river control works and highways. Permanent positions. Liberal employe benefits. Starting salaries dependent on qualifications. Please send complete resume to Hugo Niemi, Personnel Manager.

HARZA ENGINEERING COMPANY
400 W. Madison St.
Chicago 6, Ill.

STRUCTURAL DRAFTSMEN

A national major steel fabricating firm rapidly expanding its West Coast division offers attractive, permanent positions to experienced structural detailers and checkers.

LIBERAL EMPLOYEE BENEFITS

Please write giving all pertinent information regarding age, qualifications, references and salary requirements, to:

Mr. C. C. Buckley
PITTSBURGH-DES MOINES STEEL CO.
P. O. Box 1112 Fresno, California

GRADUATE CIVIL ENGINEERS or ARCHITECTURAL ENGINEERS

Major Southwestern general contractor needs engineers for work in estimating dept. Job requires investigation and take off and can also lead to field work depending on interest of employee. Excellent opportunity for young men to obtain desirable position with reliable firm doing all types of construction work. Have openings in El Paso, Dallas, and Los Angeles offices.

ROBERT E. McKEE
GENERAL CONTRACTOR, INC.
PO BOX 562 EL PASO, TEXAS

HIGHWAYS AND BRIDGES

Designers	Draftsmen
Resident Engineers	Field Engineers
Soils Engineers	Inspectors

Openings available in New York State and New England. Send resume, including Education, Experience, Availability and Salaries in application letter.

FRANK L. EHASZ
CONSULTING ENGINEER
40-29 27th Street
Long Island City 1, N. Y.

STRUCTURAL DETAILERS

Permanent positions for structural draftsmen having at least three years experience, with structural steel fabricators, on bridge and building work. Modern air-conditioned office with all employee benefits.

ST. JOSEPH STRUCTURAL STEEL CO.
Box 68, Station A St. Joseph, Mo.

FIELD ENGINEER

To supervise erection hydro plant equipment—cranes, hoists, gates, valves —for major U. S. mfgr. Knowledge electrical circuits desirable. Prefer married man, no family. Permanent position. Salary plus car and bonuses. Write complete resume of education, experience. Specify age and salary desired.

P. O. DRAWER E, ALAMEDA, CALIFORNIA

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Designers Detailers Draftsmen
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Bridges, Expressways, Turnpikes

PERMANENT POSITIONS DEPENDING ON EXPERIENCE AND ABILITY
PAID VACATION, SICK LEAVE HOSPITALIZATION, LIFE INSURANCE
INCLUDE EDUCATION, EXPERIENCE, REFERENCES AND SALARY EXPECTED IN APPLICATION LETTER

Howard, Needles, Tammen & Bergendoff
1805 GRAND AVE. KANSAS CITY 8, MO.

SUPERINTENDENTS

Enterprising general construction firm desires to employ superintendents for industrial or commercial building construction. Location Northeastern United States. Give full resume; strictly confidential.

P-1433, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

HIGHWAY ENGINEERS
DESIGNERS - DRAFTSMEN - SURVEYORS
Expanding Highway Program
Permanent Positions Depending on Ability
Send Complete Resume and Availability

ROBERT W. LOWRY
Consulting Engineers
227 PINE ST. HARRISBURG, PA.

WANTED—EXPERIENCED
Specifications writer

Preferably familiar with Architectural Engineering
Assist in General Co-ordination
Work in our Boston Office

Metcalf & Eddy Boston, Mass.
Statler Office Building

HYDRAULIC ENGINEER

New York consulting firm has opening for an engineer with sound basic knowledge of hydraulic principles. At least 15 years experience desired, preferably in the general field of electric power production or water supply. Work includes:

(1) **Office and field engineering for dams, spillways, flow lines and hydro-electric stations.**

(2) **Hydrological studies of surface and ground-water supplies.**

(3) **Field investigations of sites for steam electric and hydro-electric stations including preparation of preliminary economic comparisons.**

Write giving complete details of experience, education and personal data.

P-1485, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

HIGHWAY ENGINEERS

OPPORTUNITIES IN ST. LOUIS FOR

Designers
Detailers
Draftsmen
Soils & Drainage Specialists

Location & Construction Engineer for Foreign Service

PERMANENT EMPLOYMENT FOR QUALIFIED MEN ON EXPRESSWAYS. FREEWAYS AND TURNPIKES

VOLUNTARY RETIREMENT PLAN AND OTHER BENEFITS

Send Full Resume to

SVERDRUP & PARCEL ENGINEERING CO.

1134 LOCUST ST. ST. LOUIS 1, MO.

WANTED

CIVIL ENGINEER

PUBLIC WORKS DEPARTMENT, ENGINEERING DIVISION, TOWN OF NATICK

Applicants must be graduate C.E. or have 2 years Engineering College or equivalent and experience in Field Engineering, construction, inspection, and surveying in connection with Highways, Water and Sewer Systems. Administration experience in Engineering Office desirable. Salary Range $4830 to $5310. Vacations. Insurance (life plan.) Retirement System. Applications will be received in the Office of the Director of Public Works, Mr. Walter F. Burdick, 44 Middlesex Avenue, Natick, Massachusetts.

STRUCTURAL ENGINEER

Opportunity with a structural steel fabricator for a structural engineer having five (5) to ten (10) years (or more) structural design, detailing and estimating experience on all types structural steel structures.

Send experience record, references, and statement of availability. Salary open and commensurate with experience.

PITTSBURGH BRIDGE & IRON WORKS
1601 Union Bank Building
Pittsburgh 22, Pennsylvania

AUTOMOTIVE ENGINEER

Graduate M.E. with minimum 5 years' experience involving design, selection or preparation of specifications for the construction and use of heavy, medium and light off-road automotive equipment. For work in Company's Equipment Engineering Department. Will prepare specifications for manufacture, economic and engineering analysis for selection and guidance for tests and inspection of purchased equipment. Salary commensurate with qualifications.

Write outlining personal history and work experience. Please include telephone number.

Recruiting Supervisor, Box 132

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, NEW YORK

BRIDGE and HIGHWAY DESIGNERS and DRAFTSMEN

Excellent opportunity for men with experience on bridges and expressways. Give complete resume and salary required in first letter.

RICHARDSON, GORDON and ASSOCIATES
3 Penn Center Plaza
Philadelphia 2, Pa.

CEMENT MANUFACTURING SPECIALIST, approximate seven months assignment overseas on staff of American consulting firm to advise local industry with emphasis on plant layout for additions and new construction, through start-up.

P-1602, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

SURVEYORS

(TOPOGRAPHIC)

Challenging opportunities for Party Chiefs and Instrumentmen experienced in map survey control. Experience with aerial photographs and theodolites desirable. Permanent positions; considerable travel necessary. Forward detailed resume and salary desired.

AERO SERVICE CORPORATION
Photogrammetric Engineers
210 E. Courtland St. Phila. 20, Pa.

ENGINEERS - GEOLOGISTS - TECHNICIANS - INSPECTORS

Experienced in concrete—soils—asphalt paving.

Industrial and Highway Projects.

Openings in several grades, including opportunities for engineers and geologists (P.E. registration).

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TOLEDO 2, OHIO

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REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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Partner Wanted expanding fabricators of Coffee Processing machinery and equipment need partner to promote sales and supervise construction in Central and South America. Wonderful opportunity. Knowledge of Spanish desirable. Capital investment $5,000. Full particulars in first letter. BO-1535, Engineering News-Record.

Capital Available former contractor desires to connect with young aggressive construction outfit wishing to expand. Advise type and scope of present jobs. Location unimportant. BO-1536, Engineering News-Record.

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Learn latest methods to organize and run work. Prepare for the top jobs.
Send post card for details.
GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
P.O. Box 921 Lake Worth, Florida

WANTED
Complete Pull Shovel Attachment
To Fit Osgood Model 810
Will consider
36" cutting width bucket
42" cutting width bucket
SOMMER BROS. CONSTRUCTION CO., Inc.
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WAtkins 4-1809

WANTED
Stiffleg Derrick For Clamshell Operation With 9-Ton Capacity At 68 Ft. Radius. Complete With 90 Ft. Of Boom—3 Drum Hoist—Swinger and Electric Powered
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SKANEATELES, N. Y.

FOR SALE: 550'—36" HEAVY DUTY CONVEYOR
complete with rollers on steel sections, head and tail pulleys and electric motors, excellent condition. Prices on request, f.o.b.
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Phone: Groveport, Ohio 3-1327

1954 D-4 LOADER
Caterpillar D-4 Tractor with 1 yard front end loader. Good condition. Inspect in our yard. $7,500.00.
North Jersey Equipment Co.
450 Route 1 Newark, N. J.

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Mundy; Double Friction; Drum; Electric; Capacity 18000 Lbs. @ 200 F.P.M. at each drum at same time; Geared 20.5 to 1; Diam. of Drums 21"; Distance between Flanges 48"; Diam. of Flanges 48½"; Rope Winch on Each Drum. Driven by G. E. Slip Ring Motor; 3/60/2200; 585 R.P.M. Photos and Drawings available.
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FOR SALE
2—200 HP Babcock & Wilcox water tube boilers. Straight tubes, longitudinal drum, excellent condition, allowed pressure 160 lbs. Operating at present time, available in summer. Can be inspected by appointment.
Price $5,000 each as is, where is.
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16—DC100 Dump Trucks
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GI 2-6190

FLUSHER TANK TRUCKS
Two—two thousand gallon tanks mounted on 1948 Federal trucks in good condition. Suitable for sprinkling or fuel oil transport. $1,500.00 each.
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STEEL CARFLOAT
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Construction & Power Machinery, Inc.
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South 8-4900

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FOR SALE
1950 Marion model 43M 1 cu. yd. Backhoe serial #9389, long crawlers, 30" pads, Caterpillar D318 Diesel Engine—machine in good condition.
Write or Call
B. NIFOSI,
Paterson, N. J. OL 2-2940.

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World's Best Rebuilts

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600′ Worth. Diesel	(4) wheels (5)
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STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton — 18" to 56" Track Gauge
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FOR SALE
DIESEL ELECTRIC LOCOMOTIVES
STANDARD GAUGE
25 - 35 - 40 - 50 - 65 - 75 - 100 tons
and
6 Alco - 1950 - 1500 H.P.
2 Alco 115 ton - 900 H.P. 0-4-4-0
8 wheel
Write for Details
FRANK M. JUDGE & CO., INC.
7010 Empire State Building
New York 1, N. Y.

MIXER—FOR SALE
One—28-S Koehring Concrete Mixer with Batch Hopper & Water Tank—Gas or Electric Driven
Price $1500.00
Abbott Equipment Company Inc.
133 Southampton St. Boston, Mass.
Tel Highlands 5-6700

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4 DRUM HOIST
Nuvo—150-FPM—8000 SLP—
Powered with Buda 6 cyl. HP-326.
Price $2750.00
PARKER—PARKINSON, INC.
519 N. Delaware Ave. Phila. 23, Pa.

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UNUSED Army Trucks
2½, 3½, 5-ton
GMC-DIAMOND T & INTERNATIONAL 6x6's

- *From Government Storage!*
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Tandem axle trucks with front wheel drive, 10 forward speeds, overdrive, brand-new mud and snow tires. Carry maximum loads, give extra power you need in "rough going" . . . at LESS, often half the COST of conventional new trucks.

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Sales Manager

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CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS
766 SO. THIRD ST. MEMPHIS, TENNESSEE

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MANITOWOC SPEEDCRANES
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Capacities to 70 Tons
Booms to 140 ft. and 30 ft. jibs.
Special rates on long rentals
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CRAWLERS — Capacities to 60 tons, Booms to 180 ft.
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P and H. Lima and Manitowoc.
Top-Condition erection cranes
ROGER SHERMAN
CRANE SERVICE, INC.
East Hartford, Connecticut JAckson 8-4106

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STATIONARY—PORTABLE—MOBILE & MARINE
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Drivers Want Better Roads

More passenger cars are using the new Ohio Turnpike than the planners of this modern traffic facility estimated. But at the same time commercial traffic has been disappointing to a degree that total revenues have been held to considerably below the original estimates. This has led to the charge in some quarters that the turnpike will not be a financial success—a premature conclusion at best since the road has been open less than six months, and still lacks certain connections and other potential revenue-producing facilities. What is less premature, however, about the Ohio Turnpike is that it has again demonstrated that drivers want good roads, and will pay extra to use them.

Even the fact that many trucks are avoiding the turnpike does not abrogate this conclusion because, given a free choice, the truck drivers, as distinct from the truck owners, would probably have traveled the better road just as the passenger car drivers are doing. It is a fact, of course, that if enough passenger cars leave the free roads for the toll roads, the free roads will be easier to drive and thus more efficient and attractive for the trucks. And if toll roads cannot be financially successful without truck revenue, a serious threat to more toll road construction could arise.

But this, too, is a premature conclusion until all efforts have failed to get enough trucks to travel the Ohio Turnpike. In the meantime, experience with this modern road, as with others of the same type, does justify the conclusion that drivers prefer better roads and will pay extra to use them. Here is a plain indictment of our older, inadequate roads, and definite proof that their replacement can be financed, if not by revenue bonds that can be made attractive, then by higher taxes. By whatever device, drivers are willing to pay for the roads that we need.

Fees Must Be Adequate

The quality of school planning is at stake in the outcome of a deadlock between Delaware officials and that state's chapter of the American Institute of Architects over fees. The state, like any other client, is perfectly within its rights in refusing to pay more than 5% of construction costs for the services of architects and engineers. Similarly, the architects are exercising their legitimate freedom of choice in refusing to sign contracts containing the 5% limit. Meanwhile, though, most of the state's school planning is at a standstill. (ENR Apr. 26, p. 26.)

The state's goal of reducing school costs is laudable. But to set a 5% fee ceiling in the face of evidence that shows the actual cost of planning to be higher in some cases seems naive. If costs could be erased by the simple expedient of putting a statute in the books, we would not be troubled with a school room shortage.

Any solution of the school problem requires skilled planning. And skilled planning involves much more than just the individual services of the professional man. The architect must consult engineers and other professionals, conduct research, meet drafting payrolls, buy office and drafting room equipment and supplies, and pay the hundred and one other expenses incidental to running a design office.

He can cut these expenses if he is willing to lower the quality of the job he turns out. He can seek out engineers who will work for less. He can engage less-skilled designers and draftsmen. He can spend less time searching for ways to save money and improve quality.

But if he makes these economies—and what alternative has he under a 5% ceiling, short of refusing jobs altogether?—the school building commissioners may find themselves paying construction dollars to save planning pennies. More important yet, the community may be left holding the bag with ineptly planned schools.

No Iceless Seaway

Now that the St. Lawrence Seaway is actually being built, an old scheme for keeping that waterway open during winter months has been revived. Theoretically, there is enough heat in the deep waters of Lake Ontario to keep the ship canal and river open, provided the warmer deep waters can be made to flow through the outlet of the lake into the St. Lawrence River. That could be done "at considerable expense," according to proponents of the scheme. The need for year-round movement of iron ore from the deposits in Labrador up into Great Lake ports is cited now as a possible justification for the cost.

Such a scheme was proposed several years ago by a prominent Canadian engineer. As we recall the details, the cost would be very high, with no assurance that the water flowing down the river would be warm enough to eliminate ice troubles.

What the proponents of this scheme appear to overlook is the fact that the same plan would have to be put into effect at the outlet of Lake Erie to free the Welland Canal of ice before an open St. Lawrence canal would be of any value. Also some way would have to be found to keep the harbors on Lake Erie reasonably free of ice before iron ore could be delivered to steel mills via the St. Lawrence route. Actually, the steel mills have managed to operate for many years without having to have ore from the great deposits of Minnesota delivered to them by water during winter months. In the light of that experience, it is not likely that they would underwrite costly experiments for an ice-free run from Labrador.

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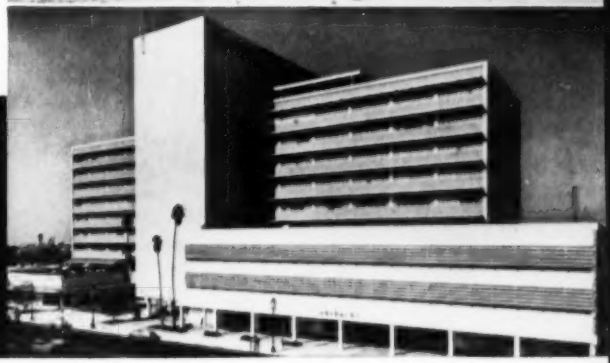
Left—Prudential Insurance Bldg., Jacksonville, Fla. Archt.—Kemp, Bunch & Jackson; Engr.—Reynolds, Smith & Hills; Contr.—Daniel Construction Co. Pozzolith Ready-Mixed Concrete supplied by Capitol Concrete Co.—all of Jacksonville.

Below—Prudential Office Building, Minneapolis, Minn. Archt. and Engr.—Magney, Tusler & Setter; Contr.—C. F. Haglin & Sons Co. Pozzolith Ready-Mixed Concrete supplied by Ready-Mixed Concrete Co.—all of Minneapolis.

Left—Prudential Building, Chicago, Illinois. Archt.-Eng.—Naess & Murphy; Contr.—Geo. A. Fuller Co.; Pozzolith Ready-Mixed Concrete supplied by Material Service Corp.—all of Chicago.

Right—Prudential Insurance Co., Los Angeles, Calif. Archts.—Walter Wurdeman and Welton Becket; Engr.—Murray Erick Associates; Gen. Contr.—Wm. Simpson Co.—all of Los Angeles. Pozzolith Ready-Mixed Concrete supplied by Transit Mixed Concrete Co., Pasadena.



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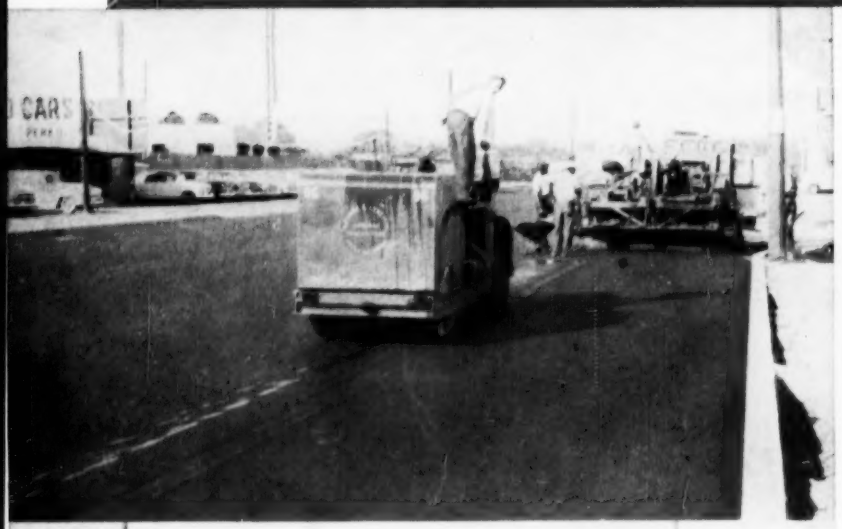

Governor Printz Boulevard in Wilmington, Del., one of numerous major traffic arteries throughout America to be paved with heavy-duty Texaco Asphaltic Concrete.

CONTRACTOR - George and Lynch, Wilmington, Del.

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